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ENVIRONMENT VIEWS

SECOND CLASS MAIL REGISTRATION NUMBER 4405 EDMONTON

VOLUME EIGHT
NUMBER FOUR
SEPTEMBER 1985

CANADIANA
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OCT - 3 1985

Waste Management

Reader Survey INSIDE

Environment Views is published quarterly by Alberta Environment. Each issue deals with a specific topic from various viewpoints with the aim of increasing awareness of environmental issues among Albertans. *Environment Views* is directed by an independent board with representation from environmental groups, government and industry. The views expressed by the publication are not necessarily those of Alberta Environment.

Subscriptions are free and can be obtained by mailing the enclosed card. When notifying *Environment Views* of a change of address, please quote the subscription number on your mailing label.

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Letters to the editor are welcomed, and should be sent to the editor,
Environment Views
Alberta Environment
Communications Branch
12th Floor, Oxbridge Place
9820 - 106 Street
Edmonton, Alberta T5K 2J6

Editor:
Maryhelen Vicars
Researcher:
Lynn Zwicky

Editorial Board:
Norman Elliott, public affairs director, Canadian Petroleum Association, Calgary; Natalia Krawetz, partner in Krawetz and MacDonald Research Management Consultants, Edmonton; David McCoy, environmental scientist, Canterra Energy Ltd., Calgary; Don Nicol, director of the communications branch, Alberta Environment; Ray Rasmussen, Alberta Wilderness Association; David Spink, head of the municipal engineering branch, standards and approvals division, Alberta Environment; Stephen Tyler, energy conservation branch, Alberta Energy and Natural Resources; and Bob Westbury, present of S.E.E.D.S. (Society, Environment and Energy Development Studies), Edmonton.

The editorial board of *Environment Views* was helped in preparing this issue by John Elson, chairman of the Alberta Special Waste Management Corporation, Edward Johnson of Kedon Services Ltd., Joe Kostler, head of the waste management branch of Alberta Environment, and Roy Neehall, systems planning and design engineer with Edmonton Water and Sanitation.

Cover Photo: R.C. MacKenzie.

Alberta
ENVIRONMENT

ISSN 0701-9637

ENVIRONMENT
VIEWS

SECOND CLASS MAIL
REGISTRATION NUMBER 4405
EDMONTON, ALBERTA

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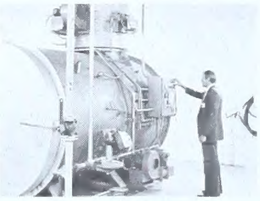

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Editor's Notebook

MARTHA JONES

Never underestimate the advantage of a small population. You may not agree if you are a retail merchant or a recent graduate looking for a teaching position, but the environmental advantages of Alberta's small population are several. As discussed in our last issue on the Eastern Slopes, while the national parks are heavily used, there are still many wilderness areas offering a retreat for both wildlife and weary urban dwellers. The human population pressure on these areas is a threat, but a manageable one compared to that facing wild areas in parts of the U.S., Eastern Canada or the Third World.

In waste management, too, our smaller population gives us the luxury of careful planning and holds the environmental threat to manageable proportions. A positive example of this is the Swan Hills hazardous waste facility, sited and under construction to serve light and medium industry while the hazardous or special wastes problem is at a prevention rather than crisis stage. (see story p. 10)

It seems to be a consensus among those in the field that separation at source is the objective of waste management for the future, but here, our small population and small industrial sector could be a hindrance. Many resources are scrapped because there just isn't the volume to justify the capital cost of the equipment needed to reprocess them or a large enough market for the reprocessed goods (see Gail Gravelines' recycling story p. 16).

If these problems can be worked out, there remains what could be called the co-operation factor: can individuals and industry be persuaded to make the effort to recycle, reuse and reduce? It has been assumed that there would be minimal economic benefits, despite considerable environmental advantage. We have a Viewpoint from Brian Nelson that argues that the economic incentives may be greater than at first perceived. He offers several examples of corporate profits and job creation resulting from pollution control and waste management initiatives.

Nelson is himself a subject of another story, for his personal approach to waste management. Linda Goyette's guide to individual action offers a number of examples and suggestions to help you cut down on the amount of stuff you set out for the garbageman.

For our next issue of *Environment Views*, we will be looking at the many intriguing natural areas of the province, and the elements which make them distinctive environments.

Included in this issue is a readership survey. Please take the time to complete the survey and return it, as we are counting on your reactions to help us to give the kind of coverage to environmental issues that will meet your needs.

We are also starting to create a new mailing list for *Environment Views*. Returning the address card enclosed in this issue will ensure that you won't miss out on further issues.

Maryhelen Vicars, a former journalist, is the freelance editor of *Environment Views*.

Norma Ramage

What is Waste?

Where it comes from and where it goes

R.C. MacKENZIE

The average Albertan probably doesn't spend a lot of time pondering the weighty question of wastes.

Of those who *do* think about waste and waste management, most consider it only in terms of carting bags of garbage out to the trash containers in the back lane.

But the truth is, every Albertan should spend some time thinking about wastes and, more importantly, about what to do with them, about disposal and waste management. Consider these Alberta Environment figures: The average Alberta family of four produces almost two tonnes of household refuse every year, projected to increase by four per cent by the end of 1985.

And that's just household refuse, itself only one part of municipal waste. To get an accurate idea of the amount of waste produced in Alberta, material produced by agriculture, industry and mining has to be added in.

Wherever there are human beings — and animals — there is waste. Mountain climbers have left garbage on Everest's 8,848-metre peak and recent figures indicate there are over 15,000 man-made objects circling the earth. Space trash! Travellers have found empty beer cans in the middle of uninhabited desert. Great advertisement for the breweries but it doesn't say good things about mankind's ability to recognize and deal with the inevitable problems of waste being produced on a vast scale.

And the inability to dispose of waste doesn't just mean an eyesore or a stench, it can also pose serious problems to human health and to the environment.

Good waste management can be, literally, a matter of life and death. In the 14th century, the rats that infested the garbage dumps of Europe carried fleas that brought the bubonic plague or Black Death which killed almost half the continent's population. Polluted rivers and water supplies today cause typhoid and other diseases.

Good waste management can be, literally, a matter of life and death.

And there's the particular scourge of more recent years — the hazardous wastes such as nuclear residue, chemicals and poisons that are toxic to man and the environment and must somehow be safely disposed of.

There's no doubt, says Alberta Environment's Joe Kostler, that government — and the public — have to confront and deal with the problems of waste and waste management.

"People only think about collecting garbage in the house and getting it to the back lane and from that point it's out of sight, out of mind. But waste management is of crucial importance. We just have to think about the diseases and problems poor sanitary practices have caused in the past."

To deal with anything, however, people must first understand it and waste isn't a simple subject.

First of all, what exactly is waste? Is it the same as refuse? trash? garbage? hazardous waste? In fact, all these terms refer to different components of waste.

Kostler, head of Alberta Environment's waste management branch, prefers a very basic definition of waste. To him, it is anything that is wasted, that must be finally disposed of and cannot be reused in any way.

But that can be a confusing definition. For example, says Kostler, manure produced by farm animals isn't waste because it has "recyclable capacity" as fertilizer.

"Then, if you treat an effluent stream at a plant and return it to the hydrological cycle, it gets reused," says Kostler, "so that isn't waste in the very broad definition."

Peter Cairns, a Calgary engineer and expert on sewage and waste management, defines waste this way: "Waste is anything that affects the environment because of people's activities.

"When people do anything, embark on any project, there is something left over and that is waste," says Cairns, manager of the pollution control division of Reid Crowther and Partners.

Both of these definitions, however, are extremely broad and all-encompassing. Experts in waste and waste management subdivide waste into a variety of categories

Peter Cairns

to simplify dealing with it and managing it.

For example, like any other substance, waste can be designated as either liquid, gaseous or solid. An example of liquid waste is a chemical effluent stream; the sulphur dioxide emitted by a sour gas plant is a gaseous waste. Solid wastes include everything from household trash to old car bodies or the sludge from sewage.

Another way to define waste, says Kostler, is to divide it into streams based on its place of origin. He identifies three waste streams: municipal, agricultural and industrial/commercial. All these streams can include solid, liquid and gaseous materials.

The industrial and commercial waste stream includes residue from mining and petro-chemical operations as well as building scraps, demolition materials, wood pulp; in short, anything generated by industry.

Agricultural waste is any organic material produced by animals as well as fertilizers, fertilizer drums, discarded machinery or machine parts, among other things.

Kostler divides municipal waste into solid waste and sewage. Solid waste includes paper, food scraps, glass, plastics, garden refuse, in fact anything the average householder leaves out in the back lane for garbage pickup.

Dividing waste into streams based on point of origin is a useful tool but it doesn't do a complete job, either. For example, it doesn't take into account the increasingly important terms "special waste" and "hazardous waste".

Many people use these two terms interchangeably, contending that special waste is only a less emotionally charged term than hazardous for the same substances.

But John Elson, chairman and chief executive officer of Alberta's Special Waste Management Corp., says the two are quite different.

According to Elson, both kinds of waste are substances which "due to their nature or quantity or persistence in the environment, require special disposal and treatment techniques." Hazardous wastes constitute a hazard to humans or the environment while special wastes do not, he says.

The dividing line between the two becomes even more blurred because so many hazardous wastes are actually special wastes that cannot be recycled or reused. Elson uses the example of oil to make his point. "The largest special waste in the province is oil. If it is recycled and reused, however, it does not become a hazardous waste."

Defining wastes is important in deciding how they are managed or disposed of. Generally speaking, solid wastes are sent either to a modified landfill or a sanitary landfill, liquid wastes are treated and returned to the aquatic system and gaseous wastes are also treated and released to the atmosphere.

Solid waste, whatever its source, usually ends up in some form of landfill. There's a public misconception about this word, says Kostler, with most people confusing landfills with the old, smelly, fly-infested "dumps". Some of these still exist but modern landfills have little in common with them.

Liquid waste is usually treated to remove harmful components and returned to rivers and lakes. Sewage, for example, goes to treatment plants which may put it through several different treatment processes to remove waste from the liquid. Industries also treat effluent and release it back into lakes and rivers.

"Industry is recycling and reducing the volume of liquid wastes," explains Kostler, "and newer plants are running as close to zero discharge as you can get."

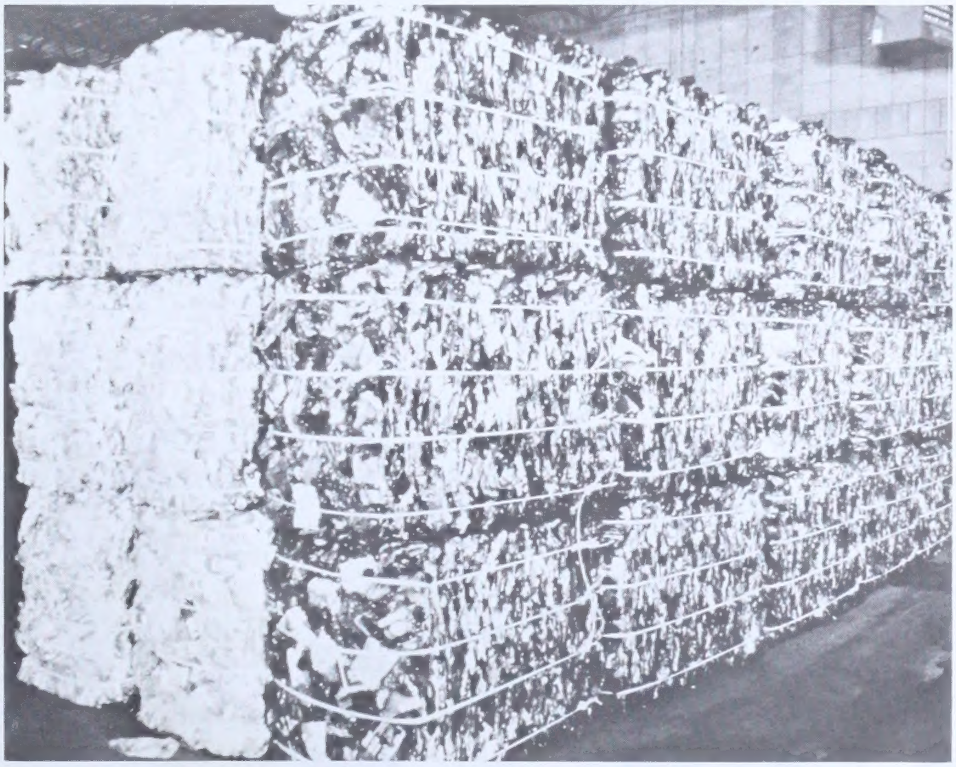
Gaseous wastes are also cleaned. For example, tail gas clean up units are used to remove poisonous sulphur dioxide from emissions from sour gas processing plants, and returned to the atmosphere.

But again, this simple breakdown is not 100 per cent useful in explaining how different varieties of waste are treated. Reid Crowther's Cairns uses the example of a sewage treatment plant to show how boundaries blur in waste management. Sewage, apparently a liquid waste, can sometimes be a solid waste or a gaseous waste and ultimately require several different kinds of disposal systems.

"When household sewage goes to a treatment plant like Bonnybrook in Calgary, it goes through several treatment stages," explains Cairns, who helped design the Bonnybrook plant.

First, the liquid stream is screened to remove large solids like rags or wood and larger objects (which, Cairns recalls, once included a complete, collapsed old-fashioned brass bedstead).

Sand and grit is also removed. Both these processes remove solids that could damage or foul up the treatment plant's machinery, explains Cairns. Then the liquid sewage is placed in a settling tank to allow solid, organic materials to sink to the bottom and be removed. A second settling tank allows aerobic digestion by bacteria of further solids. The dead organisms settle to the



R.C. MacKENZIE

Baled 2 and 3 litre plastic soft drink bottles await a new life as fibre fill for pillows.

bottom of the tank forming a second sludge waste.

Oxygen is then added to the liquid so it doesn't gobble up river oxygen. In the case of Calgary, algae-promoting phosphorous is also removed before the liquid is finally pumped into the Bow River.

But this now liquid, non-special sewage waste has left behind two solid sludges that have to be disposed of. The organic sludge is burned producing a methane gas which can be hazardous but which is usually used to fire treatment plant boilers or, in some larger plants, generates electricity which is fed into the city's power grid.

The first sludge can be incinerated, disposed of at a landfill after treatment, or it can be recycled and used as fertilizer on farmland.

In some cases, rather than being discharged into a river, sewage effluent is used to irrigate and fertilize land. "After all," says Cairns, "if it can grow weeds in a river, it can grow a crop on land." Communities like Taber and Swift Current, Saskatchewan currently use effluent for irrigation.

The average Alberta family of four produces almost two tonnes of household refuse every year.

But whether the waste is a liquid like sewage or whether it is a solid or a gas, the key to managing it, says Elson, is to separate it into its component parts as early as possible.

For example, if someone has 15 litres of potentially hazardous weed killer to get rid of, it's a lot easier to send it to the proper disposal facility at the time its thrown out rather than to try to separate it out from 50 tonnes of other waste at a sanitary landfill.

Separating types of waste at source also makes recycling easier, says Cairns.

"It's easier for me to put my old newspapers in a yellow bag at home for recycling but the piles of paper at a landfill are mind boggling, there's no way to make sense of it."

Some separation for recycling is already being done in Alberta, says Kostler. For example, almost 95 per cent of bottles in the province are recycled and reused. In addition, there is some newspaper recycling and the provincial Oil Drop program promotes the collection and re-refining of motor oil. (See story page 16)

But, says Alberta Environment's report "Recycling in Alberta", "only a small portion of potentially recyclable material is being recycled. Most of the resources which have fulfilled their original purpose end up burned or buried as garbage."

R.C. MacKENZIE

The reasons for this are diverse. In some cases, it's a matter of attitude. It's difficult, says Kostler, to persuade people to separate their garbage, for instance, to make recycling easier. "The bottle recycling program is working well but there's a financial incentive there for people to take their bottles and cans back to a depot."

People also may not like the idea of using something like recycled sewage to grow crops, says Cairns. "The person who would use steer manure on a garden would say 'oh no!' to the idea of using human waste to grow crops on farmland."

Another problem, explains "Recycling in Alberta", is that population centres in the province, like much of Canada, are scattered over a wide area, making it difficult to get enough material to justify the cost and difficulty of building a recycling operation.

But the single biggest problem, says Kostler, is one of dollars and cents.

"For example, we've done some studies into collecting methane gases from a landfill but we have so much natural gas, it's a matter of economics. Natural gas is cheaper, so there's no economical reason to bother."

New and expensive plants are needed to recycle material and it's often difficult to find markets. It's also difficult to get people to separate potentially valuable material — like paper, metal, glass and rubber — from their garbage, says Cairns.

"We can make industry do things like this by regulation and by licensing, but it's a different thing to make people do it."

But it will eventually come to that point, insists Kostler. Although he, Cairns and Elson all agree Alberta is in a position of prevention rather than cure in terms of serious waste management problems, Kostler believes the province and its people "should be moving toward recycling and better waste management *now* before we have to do it."

Norma Ramage is a Calgary journalism instructor and freelance writer.

MARTHA JONES

R.C. MacKenzie

Landmarks in Waste Management

Legislation and regulation over the years

R.C. MacKENZIE

Even the collection of garbage has become more sophisticated. Only one person is needed to operate this unit.

To bring about significant changes in the way our wastes are handled, proper legislation along with an adequate mechanism to enforce it, is essential. However, legislation alone will not cause all the desired changes. The truth of this can be illustrated by reviewing the history of waste management in Alberta.

When comparing the way our wastes are handled today versus earlier years, the 1950s are as good a place to start as any. Disposal sites were located out beyond the edge of town. Usually these "garbage dumps" — as they are properly known —sprang up out of nowhere. Typically they tended to be in places like clearings in the woods, natural depressions in fields, sloughs, river banks or coulees — wherever trash could be thrown out of sight; the municipal equivalent of sweeping dust under the carpet. No fence surrounded these dumps, nor was the garbage ever covered with soil. The stuff just sat there in a pile attracting flies, scavenging animals and birds. Dumps were almost always on fire, the theory being that this was a good way to keep the pile from growing too large. It was also a highly successful way to set fire to nearby forests, fields and dwellings.

"Back in the '50s, the only control on dumps was the regulations governing nuisances," said L.E. Stewart, who retired in 1977 as a director of health inspection services for the Provincial Board of Health. "All that was required then was that dumps be a specified distance from dwellings or roads. You didn't need permission to establish a site and there were no provisions for how they were to be operated."

Over the next decade, more sophisticated concepts of environmental health arose, primarily in Britain and the U.S., which found their way to Alberta in the form of disposal site operations known as "modified landfills" and "sanitary landfills". This caused a series of changes to waste disposal regulations culminating in the Board of Health's Regulations Respecting The Control of Refuse Disposal Systems under the Public Health Act. These regulations, in an amended form, came into force in 1972.

At this point, we must digress to recognize a pivotal event. On April 1, 1971, Alberta's Department of Environment became a legal entity. When the department was formed, it assumed responsibility for the Beverage Container Act, and the Agricultural Chemicals Act came over from the Department of Agriculture. Both of these acts led to significant improvements in certain aspects of waste handling.

SUSAN BRUN

Jim McKinley

> *Suddenly farmers began hauling their empty containers to these sites. It just caught on.*

Because the Agricultural Chemicals Act contains provisions that allow the environment minister to specify disposal procedures for empty herbicide and pesticide containers, Alberta Environment initiated a collection program in 1980 that has since been copied in Saskatchewan and Manitoba.

Explains Jim McKinley, supervisor of licensing in Environment's pesticide chemicals branch: "We had been getting a lot of complaints about chemical containers strewn along ditches and in rivers in southern Alberta. So as a pilot project we went in there and removed the containers. We needed some place to store them so we piled up the containers in various spots and surrounded them with snow fencing. Suddenly, farmers began hauling their empty containers to these sites. It just caught on. There was no set plan. We found the same problems in other parts of the province so we set up storage locations there, too. We've managed to get funding every year since and have now established about 80 permanent storage sites and about 45 temporary ones that are used for short periods of time."

Last year 587,000 containers were deposited at storage depots. All the metal ones, which represented 40 per cent of the total, were routed through scrap dealers to the steel industry where they were recycled. The remaining 60 per cent were plastic. They are being stockpiled until some method is found to recycle them.

McKinley said it's been decided the program can be handed over to private enterprise. He hopes the changeover will happen within two years and he believes the program could be run in a similar manner to the bottle depot system.

In August 1972, Alberta Environment established an industrial waste branch within the standards and approvals division to work with industry and other government agencies whose interests involved the generation and disposal of industrial waste materials. One such agency is the Energy Resources Conservation Board (ERCB), which has some say over the way oilfield wastes are handled. But, as explained by Dwayne Waisman, senior environmental co-ordinator in ERCB's environment protection branch, "the exact position of the line drawn between our responsibilities and Environment's hasn't been decided."

Despite the rules, "a lot of waste is going where it shouldn't."

Noted Waisman: "ERCB administers waste disposal requirements, if we're talking about disposal of wastes on a rig site. If, in the process of moving crude oil products offsite, a spill occurs, that is the board's responsibility too. But if the waste spilled is a refined product or if we're referring to waste disposal at a refinery, that becomes Alberta Environment's responsibility. Over the years, specific rules have been developed for individual types of wastes, whether they are oil wastes, sump fluid wastes or gas plant wastes."

Despite the rules, Waisman said, "a lot of waste is going where it shouldn't." Added Jim McKinley: "One of our biggest problems right now is the full drums of chemicals we're getting from the oil patch at our storage depots. We're not set up to handle that sort of thing. We want empty containers, not full ones, and certainly not when they're filled with unknown wastes. I think oilfield workers don't know where else to take it."

In 1973, the newly formed municipal engineering branch of Environment's pollution control division initiated a derelict vehicle disposal program. The department paid contractors to collect junked cars and deliver them to scrap dealers. By 1979, it was decided contractors could carry on without government support, at which point Environment bowed out of the program.

In 1972, the Litter Act came into force. It annually generates numerous citations — and several prosecutions of individuals.

During 1975-76, the waste management branch of Alberta Environment was formed. It was given the responsibility of implementing improved management concepts for solid, liquid and hazardous wastes. By this time, the Board of Health's Refuse Disposal Regulations had been in force four years, but they had virtually no impact on the way municipal waste disposal sites were being operated. One positive change that occurred, though, was in response to the Board of Health's requirement that every new disposal site undergo hydrogeological testing to make certain that wastes deposited there wouldn't pollute surface water or groundwater. Regulations also stipulated that instead of refuse being thrown on a pile on the ground, it be placed in a trench.

"Municipalities were also required to compact refuse in the trench and cover it with soil a certain number of times each year," said Lyndon Davies, a senior public health inspector now based at the Stony Plain-Lac Ste. Anne Health Unit. "That rule was almost never followed. Municipalities tended to cover the trench when it was absolutely full and, to keep it from getting full, garbage was always on fire. Although burning was prohibited, there was no way you could stop it from happening if communities didn't supervise the landfill or somehow restrict access to it."

Added Rob Elliott, senior public health inspector at the Alberta East Central Health Unit in Stettler: "The burning business was definitely a weakness in the system. But another problem was a grandfather clause that allowed dumps in existence prior to December 31, 1967 to continue to exist. That let a lot of poorly located dumps stay in business."

To knowledgeable observers, it was clear that many disposal sites which municipalities were trying to pass off as modified landfills or sanitary landfills were merely dumps masquerading under a new name. That's when Alberta Environment decided that training, education, research and development and financial assistance services were required if waste disposal practices were to be improved.

Waste management branch staff began promoting the concept of regional sanitary landfills and in 1976 committed funds to build a demonstration landfill in the Crowsnest Pass. History has shown this action, more than any other factor, has made Alberta one of the most progressive areas in North America in the field of waste management.

ALBERTA GOVERNMENT PHOTO

Feedlots can be a source of local pollution. Many operators are now taking such waste management measures as controlling surface runoff.

LABBATT'S ALBERTA BREWERY

Almost all these bottles will be returned for reuse or remanufacturing.

The process also caused some confusion. As Environment took a more prominent role in waste management, there began to evolve the idea that eventually the department should take over regulatory responsibility from the provincial Board of Health.

Explained L.E. Stewart: "We definitely asked ourselves whether authority for waste management should remain with the board. But there never seemed to be much of a decision on it one way or the other because waste management is both an environmental concern and a health concern. It appeared that both departments had a role to play."

When Alberta Environment decided not to pursue the matter further, the minister of social services and community health, to whom the Board of Health reports, decided the transfer of waste management responsibility to Environment would not proceed.

"Until this happened, we couldn't get municipalities to listen to us," said Lyndon Davies. "We'd go to council meetings and say, 'you really should clean up your dump' and they'd tell us, 'well, we're working with Environment to come up with a regional landfill, so don't bother us'."

In 1982, after Environment's waste management assistance program had helped establish nearly a dozen regional landfills — all of which are properly operated as sanitary landfills — refuse disposal regulations under the Public Health Act were revised yet again. This time, stipulations prohibiting open burning were dropped and replaced by a requirement that burning was permitted if a municipality first obtained a permit. Health inspectors say this hasn't made much difference. Conditions attached to the permit make it almost impossible for unsupervised landfills to satisfy the requirements. Hence, few permits have been issued, and open burning continues unabated anyway.

> *"Where we have controlled sites, we don't have much of a problem any longer."*

"In our area," said Kenn Blom, senior public health inspector based in Coaldale for the Barons-Eureka-Warner Health Unit, "the requirement for permits hasn't cured a thing."

But Rob Elliott said his health inspectors have clamped down on municipalities and given them two choices: either join a regional system or operate landfills properly with, among other things, a fence, a gate and a supervisor. Said Elliott: "Where we have controlled sites, we don't have much of a problem any longer."

The latest in this long line of regulatory changes was proclaimed Aug. 1, as Waste Management Regulations under the Public Health Act.

Passage of the Hazardous Chemicals Act and Hazardous Waste Regulations in 1980, followed by creation of the Special Waste Management Corporation in 1984 and proclamation of amendments to the Hazardous Chemicals Act in March of this year have allowed Alberta to leap-frog every other industrial area of Canada by establishing an integrated system to treat hazardous wastes. When the announcement was made in March 1984 that Swan Hills would become the site for Alberta's treatment plant, it was the first time in six years that a hazardous waste treatment plant had been sited with public approval anywhere in North America.

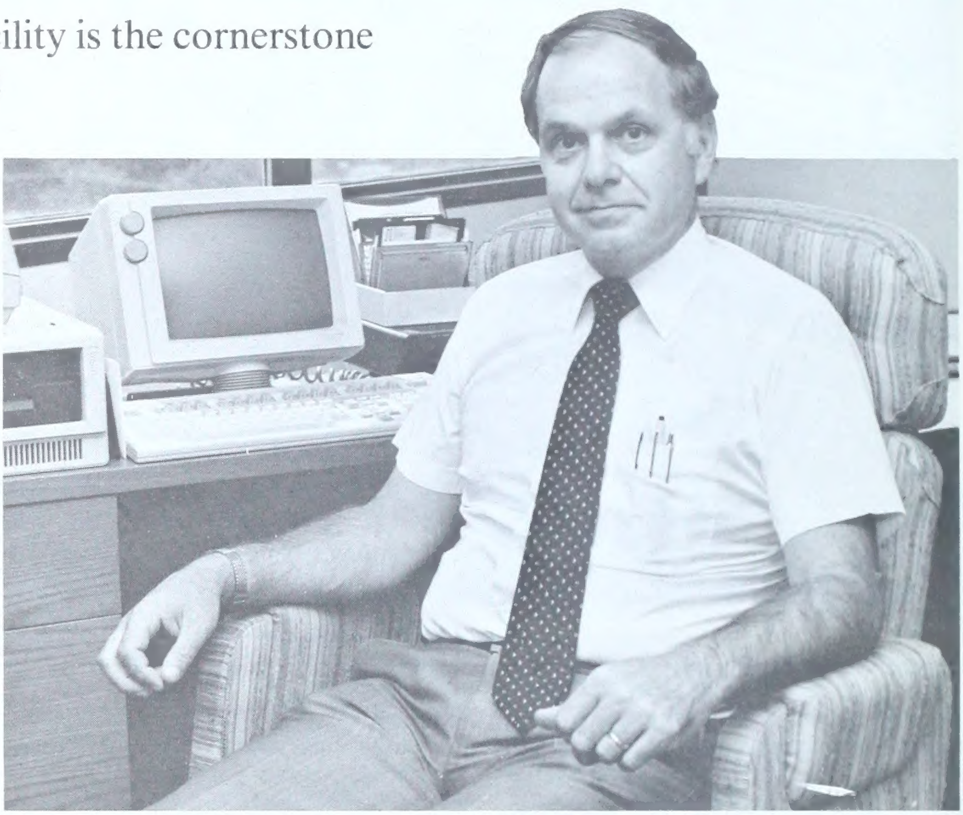
Even out in the agricultural community waste management has improved. When it was first released in 1973, a code of practice for the management of manure from feedlots was rebuffed by farmers. But Brian West, animal waste management specialist with Alberta Agriculture, says that farmers are now urged to obtain a voluntary certificate of compliance which, if approved by various regulatory agencies, indicates that certain practices — such as collecting and containing surface runoff — have been adopted by a feedlot operator.

R.C. MacKenzie, an Edmonton freelance writer, is the former administrator of regional landfills for Alberta Environment.

Sharon Adams

Hazardous Wastes

The Swan Hills treatment facility is the cornerstone of Alberta's treatment system



John Elson

FRED KATZ

In a way, Alberta's sudden late-'70s sensitization to hazardous waste disposal was all a matter of timing.

In 1978 a U.S. national emergency was declared at Love Canal, Hooker Chemicals and Plastics Corporation's 1940s and '50s chemical dumping ground. Sensational stories focused on the unusual numbers of miscarriages, birth defects and diseases, including cancer, suffered by Love Canal residents.

The issue suddenly came closer to home when Kinetic Contaminants Canada Ltd. began looking for a site near Edmonton to build a hazardous waste treatment facility. Reacting to public concern, the province formed a hazardous waste management committee to study the issue. Its report was widely discussed at public hearings held throughout the province by the Environment Council of Alberta in 1980.

The province set criteria for special waste management facility development, deciding it would select and own the site, guaranteeing management of wastes in perpetuity. The government wanted assurance the transportation, storage, disposal and facility shutdown would pose as little risk to the public as possible.

The public continued to be skeptical. Eventually, five communities which met the geological, biological and land use criteria held plebiscites on their own initiative to consider siting; two were successful, and Swan Hills was approved by cabinet.

The Swan Hills special waste management facility will be a joint public-private industry operation. The province, (primarily through the Alberta Special Waste Management Corporation [ASWMC]) will set and enforce standards, licence facilities and monitor operations while private industry (Chem-Security Ltd.) will build and operate the central facility and the transportation network.

"The Swan Hills facility," says John Elson, ASWMC chairman, "is the cornerstone of an integrated special waste management system." It will be backed by a transportation network, a series of transfer stations and monitoring. Over the long term, he sees the system accommodating all Albertans' needs, from large industry, which will continue to dispose of hazardous waste itself, to the Swan Hills facility clients, to the householder. In future, householders may be able to take hazardous wastes such as empty paint, pesticide and herbicide containers to a neighborhood collection depot for disposal at Swan Hills.

Most wastes have the potential to be hazardous if not treated properly.

Dr. Walter Harris, a ASWMC board member, says "all of us are generators of hazardous wastes — the housewife as well as big industry." He says that while most hazardous wastes produced in Alberta are treated by industry itself, the rest is being "stored or dumped". There are "possibly 1,000 dump sites in Alberta — and some are not so well managed. And there are some midnight dumpers".

But what are hazardous wastes, and how will the Swan Hills facility treat them? Elson defines hazardous waste as any substance which, due to its nature and quantity or persistence is potentially dangerous to human health or to the environment and requires special treatment and disposal techniques to eliminate the hazard. Most wastes have the potential to be hazardous if not treated properly. Some 3,000 are identified by the Hazardous Chemicals Act, which takes into account whether substances are toxic, flammable, cause cancer or mutation, can produce or spread disease, become concentrated in the food chain, or are radioactive.

Between 80,000 and 100,000 tonnes of hazardous wastes are produced in Alberta yearly. The bulk of these wastes are treated on site directly by their producers. About 25 per cent of these wastes are produced by small and medium-sized industries which cannot afford expensive treatment equipment.

The top dozen producers of hazardous wastes are drilling and oil field businesses, metal, machinery, rubber, chemical and iron and steel works, paper plants, vehicles, refineries, hospitals, dry cleaners, and the electrical industry. The largest volume of hazardous wastes produced annually are nonrecyclable waste oils (26,000 tonnes), acids (22,000 tonnes) and waste chemicals (12,000 tonnes).

Initially, the $35 million Swan Hills facility will be capable of handling 20,000

The Research Challenge

The spectre of Love Canal has caused a persistent public skepticism about hazardous waste disposal. Yet Canadian research is not only offering hope for a cleaner future, but for salvation from mistakes of the past like Love Canal.

Scientists are finding new ways to dispose of hazardous wastes and improve current disposal methods.

"There will be a real (research) stampede in the next decade," says Mike Joseph, of Pyrolysis Systems Inc. (PSI), which is developing futuristic plasma torch, or arc, technology. "There's the potential to make a lot of money. The stores of wastes in Canada alone are staggering. And where there's money to be made, there's research going on."

Perhaps the most exciting development is the commercial prototype of a mobile plasma arc unit, developed at Royal Military College in Kingston. Before the end of the year it will begin destroying Love Canal wastes collected over the past five years. It will take about three months.

A team of researchers, headed by Dr. Tom Barton, an RMC professor, has worked for about 12 years perfecting the technology. Essentially the plasma arc is an artificial lightning bolt, says Dr. Joseph. Ionized air is passed through an electrical charge, creating plasma, the fourth state of matter. Liquid wastes fed into the plasma are atomized (broken down into elements) by ultraviolet radiation and heat between 10,000 and 15,000 degrees Celsius. For instance, polychlorinated biphenyls, PCBs, are broken down into carbon, oxygen and hydrochloric acid.

"It's years ahead of what's available right now," Dr. Joseph says. And PSI will continue its research for new applications of plasma arc technology — like using the torch to treat solid wastes.

There has even been research into the technological failure which produced Love Canal's problems. Bob Lutz, superintendent of environmental control and industrial hygiene for Dow Chemical Canada Inc. in Fort Saskatchewan says many problems today result from yesterday's lack of landfill technology. "But this technology hasn't been stagnant."

He says huge strides have been made in landfill design and construction — technology which Dow has incorporated into its Fort Saskatchewan plant waste management plan. "The biggest concern with a landfill receiving chemicals is that some chemicals can be dissolved in water, moving as the water moves."

Dow's secure landfill is constructed on impermeable compacted clay and has two liners with weeping tile between. "If there's a breach in the first liner," says Lutz, "material will be collected by the tiles and go to a sump. That zone between the liners is kept dry to prevent material from migrating downwards."

In addition, Dow uses sophisticated soil and groundwater monitoring systems, including lysimeters under the landfill itself. Lysimeters are hollow, metre-long, cigar-shaped, porous ceramic containers, with a pair of tubes connected to manifolds above ground. Creating a vacuum in the container causes water to infiltrate. When the vacuum disappears, water samples are collected and analyzed.

Dow's landfill is so dry, says Lutz, they've had difficulty getting lysimeter water samples. "That's what we want. We don't want groundwater coming up from the bottom."

Steve Hrudey, a University of Alberta environmental engineering professor, says most new technology is for producers of one consistent, large, waste stream. This technology may not help general hazardous waste treatment facilities, like Swan Hills where it may not be cost effective since Swan Hills' small- and medium-sized clients is not likely to produce large enough quantities. So improving current technology is as important as developing new technology.

One important development is improving incinerator efficiency. High temperature rotary kilns, which burn wastes at temperatures between 900 and 1,400 degrees Celsius, have been developed. Dr. Hrudey says these are ideal for "chemical producers with a consistent waste stream" because a rotary kiln incinerator will handle "everything from soup to nuts."

I KNEW THERE WAS A WAY TO GET RID OF THAT STUFF!
MOBILE PLASMA UNIT
WASTE

Scientists are even looking to nature to help dispose of hazardous wastes.

U.S. researchers have reported success in getting wood rot fungus to decompose such persistent hazardous materials as PCBs and DDT. This fungus breaks down lignin, the "glue" which holds wood together and makes it so hard to decompose. The researchers were spurred on by wondering if the fungus could rot something as resistant as wood, could it adapt to other difficult-to-decompose materials?

In addition to research into aerobic biological decomposition — improving the performance of oxygen-using microscopic organisms which break down wastes like sewage, researchers are also examining anaerobic decomposition. They hope to discover what controls micro-organisms' ability to degrade material in environments without oxygen. This research is of interest to industries which produce wastes with unpleasant taste and odor when exposed to the air.

– Sharon Adams

tonnes of hazardous wastes yearly — the amount now sent out of province, stored for development of the Swan Hills facility, or dumped, sometimes improperly.

Located on about 10 hectares of land 20 kilometres from Swan Hills, the facility will eventually handle organic and inorganic wastes.

Organic wastes will be burned in high temperature incinerators at up to 1,500 degrees Celsius, a high enough temperature to destroy even PCBs. Swan Hills plans to have two incinerators, one for liquid and one for solid wastes. Inorganic wastes will be chemically treated.

The facility's secure landfill will handle solid residues from its own treatment facilities (like sludges from the incinerator) and other industrial wastes suitable for direct landfilling, though Elson adds that "no raw wastes will go into the landfill".

Liquid residues from either process will be disposed of by deep well injection about 2,000 metres down.

Ken Simpson, ASWMC's vice president of operations, says the facility will be run on a double safe "belt and suspenders technique" of construction and operation. State of the art technology will be used for waste treatment and disposal, backed by a similarly cautious approach to handling of the wastes. Wastes arriving at the plant will be "fingerprinted" upon entry, tracked through the process and their eventual destruction or treatment permanently recorded.

While the special waste management system will put Alberta in the forefront of technology (the U.S. is having difficulty even finding a site for comparable treatment facilities), there are some concerns.

Critics ask if small- and medium-sized industry really does produce enough to make the Swan Hills facility economically sound, and question the legislative framework, which now has gaps.

Brian Winters, general manager of Kinetic Group Inc., says his company's early application to build a similar waste treatment plant was predicated on handling wastes from across Western Canada.

"Western Canada is an economic base for this facility." He says he doesn't think there is enough waste produced in Alberta for the plant to be economically viable without heavy government subsidization, or increasing the number of materials that are considered hazardous, or importing hazardous wastes from other provinces.

Elson says "our anticipation is that Alberta will definitely generate those wastes. We are not oversizing (the facility)."

But Winters says subsidization has already started. "The postage-stamp operation where every hazardous waste producer pays the same rate" to get waste to Swan Hills is an example of subsidization, he says.

But Elson argues the "postage stamp" policy is what will ensure maximum use of the facility. "No generator will be given a bonus or penalized because of distance from the facility. The system has to be as accessible as possible, because waste generally follows the path of least resistance."

Winters worries the definition of hazardous waste may be expanded to include innocuous materials, or those now recycled. But Joe Kostler, head of Alberta Environ-

Work began earlier this year on the Swan Hills site. One of the reasons it was chosen was the abundance of clay (above) which will help prevent dangerous materials from leaching into groundwater.

On Site Disposal

Although Swan Hills will give small- and medium-sized industry an affordable alternative for hazardous waste disposal, there are many industries which will never use the facility.

These industries, generally large-scale, dispose of their wastes, some of which are hazardous, right where the wastes are generated.

"We try to operate our facilities so we are self-contained and can handle wastes on site," says Bob Lutz, Dow Chemical Canada Inc.'s western Canada division superintendent of environmental control and industrial hygiene. "In some areas of the world there are no facilities to deal with wastes. Transportation is also a concern; the closer wastes are treated to the source, the better."

He says Dow is faced with organic, inorganic and domestic wastes at its Fort Saskatchewan site.

Office and cafeteria wastes are taken to a municipal landfill; the rest is treated on site.

Unreclaimable solid wastes are put into one of Dow's two secure on-site landfills. One is reserved for slightly contaminated commercial wastes like gravel, asphalt or wood slightly contaminated with caustic soda. The second is for "material that might be more persistent in the environment."

Dow has "taken all reasonable steps to avoid allowing water to build up in the landfill," Lutz says, because the company is concerned that water will get in, dissolve chemicals, then transport them away from the site.

The landfill is constructed with a weeping tile system between two man-made liners built on compacted impermeable clay. The weeping tile bed is connected to a sump inside the landfill itself. The sump, the area directly below the landfill, and nearby groundwater and soil are all monitored for leaching of chemicals from the landfill. Lutz reports it's "basically a dry operation" with "relatively small volumes" of contaminated water collected from the sumps, usually following snow or rain.

In addition, Dow maintains a permanent inventory of what goes into the honeycomb-like landfill. "We know where the waste came from, where it was placed and how much of it there is."

Dow's remaining wastes are disposed of by incineration, bio-oxidation or deep well injection.

A high temperature incinerator burns liquid and gaseous hazardous wastes, and the byproducts of this process can be recovered and recycled.

An on-site biological oxidation pond removes chemical contaminants from organic liquid wastes from ethylene oxide-ethylene glycol operations. Operating like a municipal sewage treatment plant, the pond has microbes which break down the glycol, ammonia and phosphorus.

Liquid wastes such as brine, process liquids and asbestos slurries are injected into rock formations underground. Well below the groundwater level at more than one kilometre underground, these wells are located in geological formations from which Dow mines salts, and which are geologically secure.

Deep well injection is also used by the gas processing industry for disposal of hazardous wastes — which originate from formations similar to those to which they are returned.

Bernie Patterson, environmental technician at Canterra Energy Ltd.'s Ram River plant, says "most people look at the sour gas industry as a pollutant, yet the process itself is environmentally clean. The only problem is with mishaps."

The University of Alberta's pathogenic waste incinerator.

SUSAN BRUN

Gas plants process gas from wells drilled deep underground. When the gas is pumped to the surface, along with it comes water (often contaminated), condensate and sulphur. The plant separates these. Contaminated water is reinjected to an abandoned well 3,000 to 5,000 metres below ground, well below where sweet water (free of hydrogen sulphide or sulphur) collects.

Sulphur is recovered for sale in the booming sulphur market; there is a similar recycling market for hydrocarbon condensates, which are sent to market via pipeline, as is the "sweet" gas.

Other wastes generated on site, he says, are scrap metals from exhausted equipment, which is sold to scrap dealers, engine oil, to be recycled, and domestic wastes which can be burned. Even the 1,200 to 1,500 tonnes of aluminum catalyst used in processing is recycled when exhausted – usually for sandpaper manufacturing.

Disposing of hospital wastes, some of which are pathogenic, can pose special problems.

Ed Collom, Alberta Social Services and Community Health's assistant manager of environmental health services, says as of Aug. 1 hospitals have been required to render their wastes non-pathogenic before disposal.

Some hospitals dispose of these wastes on site; others sterilize them before they are moved to landfills.

The W.C. MacKenzie Health Science Centre in Edmonton, which serves 130,000 patients per year and has 5,000 employees, disposes of about five tonnes of wastes per day in its two incinerators, each capable of handling up to 568 kilograms of waste per hour.

Robin Hill, director of community relations, says the incinerator for pathogenic material burns at 900 to 1,000 degrees Celsius and is used to dispose of "anything that poses a health risk," including infected material such as diseased tissue and bandages.

Innocuous wastes such as paper and wood go to the waste incinerator, an energy efficient unit which is used simultaneously to provide space heating and hot water heating.

Since the centre is a teaching and research facility, other hazardous wastes, including radioactive wastes, are produced, and are packaged and disposed of off site following municipal, provincial and federal regulations.

Salt water brought up during pumping is the petroleum industry's major hazardous waste and deep well injection of that water the major hazardous waste disposal method; yet the Canadian Petroleum Association has taken the initiative to develop a code of good practice for developing sound waste disposal techniques for other wastes.

Howard Heffler of Tera Environmental Consultants Ltd., who helped develop the 16-page guide and half-hour videotape for oil industry use, says "it's important for field people to see all these wastes can cause pollution; that landfilling is not just digging a hole and burying it and that there's more to incineration than putting it in a pit and lighting a match."

The guide, *Waste Management for the Petroleum Industry*, is a short course in integrated waste management. It outlines government waste management regulations, lists sanitary landfill locations, waste disposal and storage facilities, used lubricating oil tank locations as well as collectors and re-refiners, and the telephone numbers of resource management experts.

It discusses the principles of waste management — reduction of volume, reuse, recycling and recovery, and includes a brief course in current waste management construction, operation and monitoring technology.

– Sharon Adams

Brian Winters

Joe Kostler

ment's waste management branch, says "there are stringent criteria used to look at a chemical and determine whether or not it's hazardous, and whether it needs special disposal treatment. We have to maintain the objectivity; I don't think it's a logical approach to have things listed as hazardous wastes just to increase the volume (for Swan Hills)." Besides, he adds, too many regulatory agencies, too many acts, are involved for that kind of manipulation. He maintains that the Swan Hills' facility is "not going to affect the Alberta Waste Materials Exchange."

> *"There is no importation. We deal with Alberta wastes and Alberta wastes only."*

Finally, Winters argues that hazardous wastes may be "sneaked in" from out of province.

Kostler says, "The borders were closed to out of province hazardous wastes with the passage of the Hazardous Chemicals Act amendments and regulations."

"But you can't simply close the door overnight," he says, adding that contractors like Kinetic were allowed to fulfill contracts from other provinces until mid-May and actually stopped before the end of April.

He says "there is no importation. We deal with Alberta wastes and Alberta wastes only." Since hazardous waste management became a public issue, Alberta Environment ministers have repeatedly promised that wastes would not be imported from out of province pending completion of the Swan Hills facility. In May Environment Minister Fred Bradley told the legislature that "if surplus treatment capacity exists once the plant is operating, treatment of wastes originating from outside Alberta may be considered only under special circumstances based on a need and a specific request from another province under a policy to be developed by the Alberta government which will require authorization by the ASWMC."

Other concerns centre on existing regulatory requirements for the facility, which so far do not even promote use of the Swan Hills facility over other alternatives, nor designate disposal methods for specific hazardous wastes.

Jillian Flett of the Environmental Law Centre says, "There are no requirements that all hazardous waste generators must use the Swan Hills facility. There are also no licencing requirements for on site storage or limitations on the length of time or amount of hazardous wastes stored on the site of generation. These factors could act as an incentive to use long-term storage as an alternative to hazardous waste disposal at the Swan Hills site.

"Legislation dealing with the issue of long-term on site storage is needed as part of a comprehensive hazardous waste management system."

"Regulations are not yet in place," admits Elson, "and regulations are the key to the system."

In April the Hazardous Chemicals Advisory Committee was charged with reviewing existing regulations and enforcement. Chairman Gordon Docken says the committee expects to report to the minister in the fall regarding changes in content and enforcement provisions.

Sharon Adams is a Calgary journalism instructor and freelance writer.

Viewpoint

How does the way we operate as a society contribute to waste management problems or their solution?

Brian Nelson

The conserver lifestyle is based on living lightly on the planet.

A true conserver attempts to use the earth's resources in efficient and ecologically sound ways. If our society as a whole were to become more conservation-oriented, the benefits would be at least twofold: getting maximum use from non-renewable resources, and reducing the amount of waste of these resources.

While our society is based on consumption rather than conservation, and short-term economic decisions are often made which have environmentally harmful results, there is evidence that the economics of conservation are becoming increasingly attractive for both individuals and companies.

On the surface, it might seem that each individual's actions would have an infinitesimal effect. However, it is the action of many individuals that make powerful forces which can change the entire nature of an industry. Amory Lovins, director of Rocky Mountain Institute (which does research on energy issues), has calculated that the cumulative conservation actions of the millions of people in North America have freed a hundred times as much energy as was produced by all the new oil and gas wells, coal mines and power plants built since 1979.

Detroit was nearly destroyed by the demand for smaller, more efficient cars. People made the choice to save money on fuel, but the result was the conservation of energy and raw materials and the reduction of air pollution.

Conservaton at the individual level has become more than a moral or ethical choice; it is now a wise economic move. Following the "three Rs" — reduce, recycle, and reuse — can have a great impact on an individual's quality of life. From a personal finances standpoint, many of the conserver strategies offer large economic gains for minimal investment — a more attractive prospect than ever in tough economic times.

There are two approaches for conservation: the technological "fix" which allows a resource to be used more efficiently; or lifestyle changes, which often involve a tradeoff of more time and effort to consume or waste less of the resource.

A technological approach to saving energy would be the purchase of an energy-efficient furnace or car. If these goods were built to last longer than the conventional models, their purchase would also mean a conservation of the raw materials needed to build them, and ultimately, reduced waste management costs.

Lifestyle changes could be as simple as resisting sales pitches for the unnecessary and the disposable. Food wastes make up as much as 20 per cent of landfill volume, and much of it doesn't need to be there. Careful shopping and housekeeping would reduce these wastes and have an impact on the family budget.

Brian Nelson

Many industries are also discovering that conservation is a wise investment, giving an excellent return on the dollars invested. Companies are finding that savings can be made in a wide range of areas and that payback periods are often surprisingly short. For example, Union Carbide recovers in its U.S. operations 18 million kilograms of materials worth $1.25 million per year. According to a 1980 U.S. Environmental Protection Agency (EPA) report on waste exchange, Union Carbide netted $20 - 25 for each dollar invested by their recovery group. The 3M company saved $17.4 million in its U.S. plants in three years by eliminating or recycling 68,000 tonnes of air pollutants, 1,200 tonnes of water pollutants, 2,250 million litres of polluted waste water and 2,600 tonnes of sludge each year.

While there are Canadian companies active in recovering waste materials in Canada, the potential for recycling and reducing industrial wastes is barely being touched. Pollution Probe estimates that the generation of wastes in Ontario could be slashed by 80 per cent and a few industries such as photofinishing and painting could reach the 90 per cent level in reduction of wastes by on site recycling. While these estimates may be high, it is evident that the process of reduction and recycling can lead to reduced disposal costs, less pollution and an additional source of income for the companies involved.

Society in general can also make great savings by recycling materials. This presents an opportunity to tackle one of our most pressing problems, unemployment.

Some critics have said that protecting the environment hurts the resource extraction and manufacturing industries and results in the loss of jobs. More accurately, such actions cause a shift in employment practices and if done correctly, result in a net increase in employment opportunities. The U.S. EPA reported 32,611 jobs lost due to environmental protection laws between 1971-81. However, EPA statistics for 1982 show that for that year alone, 220,000 people were employed in the manufacturing, operation and maintenance of water pollution control strategies.

A study by the U.S. firm of Data Resources Inc. estimates that by 1987 there will be a net increase of 524,000 jobs in the U.S. because of pollution control alone.

As is often the case, the Europeans lead the way in examining the benefits of sound environmental practices. A study by Wirtschaftswoche, a German magazine, demonstrates the potertial for creating 700,000 jobs in West Germany by implementing a 10-year plan to clean up the environment. It points out that increasing the amounts of recycled glass by only 10 per cent created an extra 3,000 jobs in West Germany.

However, it is a serious mistake to view the conserver lifestyle from only an economic viewpoint. If you only look at the economics of a decision you are taking a very fragmented approach to life. Our society's emphasis on profit and growth neglects many other factors that affect our quality of life. E.F. Shumacher in his book *Small is Beautiful* sums it up quite nicely by saying "Call a thing immoral or ugly, soul destroying or a degradation of man, a peril to the peace of the world or to the well being of future generations; as long as you have not shown it to be uneconomic you have not really questioned its right to exist, grow, and prosper."

Someone who only conserves if it is economical may miss some of the truly satisfying aspects of living according to sound ecological principles. Says William Ophuls in his book *Ecology and the Politics of Scarcity:* "... once the getting and spending of material wealth has ceased to be the prime determinant of status and self esteem, the search for social satisfaction and personal fulfillment can turn toward the artistic, cultural, intellectual, and spiritual spheres-none of which are seriously confined by physical limitation."

Anyone wishing to live a conserver lifestyle should consider the words of Lao-Tzu, a Taoist sage of 5th century B.C. China. "Nature sustains itself through precious principles which one does well to embrace and follow. These are gentleness, frugality, and humility."

Brian Nelson is the ecological development co-ordinator of the One World Institute in Camrose

Tearing down an old unwanted garage provided many of the raw materials needed to build this new utility shed. All the framing materials and even some of the nails, siding and building paper were recycled. The Edmonton owners saved several hundred dollars.

Gail Gravelines

Recycling in Alberta

It has become a growth industry

Sharon Proctor at Edmonton's City Centre Bottle Depot.

When Sharon Proctor, former City Centre Bottle Depot manager, talks about her regular clientele, she describes people from one end to the other of the economic scale. There are the people in Cadillacs and Rolls Royces who pull in to cash in their liquor and pop bottles and cans. And there are the street people, the rubbies who rise at dawn to rummage through Edmonton's downtown street litter barrels and large industrial waste containers. Their living comes from the bottles and cans they cash in.

"These are people who often come from good backgrounds, who have had good jobs, but who have simply dropped out and don't want anything to do with the system. They could get welfare or take in free meals at social service centres but they don't want it. They work hard collecting bottles. They're up early. And there's a real code of ethics. Each has their own territory and they wouldn't think of picking from another person's area," says Procter. "They make up to $20 or $30 a day picking, and it's both men and women doing it."

Procter also says the street people will recover broken appliances, clothing and other goods to re-sell. Though the lifestyles of the bottle depot clientele may be extremely different, Procter believes all the individuals who return their containers share a common motivation — they want the money.

In the 14 years that the Beverage Container Act has been in effect, Albertans have flocked to the province's bottle depots, reclaiming container deposits paid at point of purchase. Alberta's bottle depot system is unique in Canada. Consumers in other provinces can reclaim their deposit only on soft drink and beer bottles and must return them to the retail outlets. But here in Alberta consumers can also return pop and beer cans and liquor and wine bottles — items not returnable in most other provinces. What effect has the act had on the consumer's recycling consciousness? Up to 95 per cent of all liquor and wine bottles sold in Alberta are returned through the depot systems.

"We're likely the busiest depot in Alberta, volume-wise. Besides the drive-in trade, we collect from restaurants, hotels and Northlands and the Coliseum," says Procter. And the tough economic times of recent years mean an even more promising future for the depots. Procter says more people than ever are returning empties — many of which have been culled from ditches and roadsides — in a drive to survive tough economic times.

> *Up to 95 per cent of all liquor and wine bottles sold in Alberta are returned.*

City Centre Bottle Depot's plans for the future include buying a paper baler to handle the boxes customers bring the bottles in. Procter says customers had been asked to take the cardboard back, because the daily volume the depot would collect would be overwhelming. With the baler the cardboard too will be sold for recycling and remanufactured into building products.

What happens to the collected containers? Soft drink and beer bottles are refilled and sold again. The liquor and wine bottles are sold to manufacturers of new glass who use small amounts of broken glass in each batch of new glass. The old glass melts at a lower temperature than raw materials that make up the new glass. The old glass helps the mixture to melt more quickly and makes the finished glass more uniform. But due to fluctuating market conditions there are times when some of the bottles are crushed and put in landfills.

Ecological concerns may prompt some to recycle, but an increasing number of individuals, industries and volunteer organizations are recycling for economic reasons.

"Recycling — both the collection of resources and the reuse of such materials as paper, motor oil, and glass containers — has seen phenomenal growth in the last three to five years," says Tom Rogers, section head of assessment and implementation of Alberta Environment's waste materials branch. "Why? I think more people have become aware of the waste management issue. The recession too has made industries more interested in the use of secondary materials."

And with the Environment Council of Alberta (ECA) holding public hearings on the recycling of wastes next spring, it's likely even more Albertans will be exposed to the recycling issue. ECA research director Dave Buchwald says a public information campaign introducing recycling concerns will be launched this fall. Through a series of advertisements, public information meetings, and possibly with a film, the ECA will give the public the needed background information to address the topic.

The hearings will explore the potential for, and obstacles to increased recycling by business and volunteer organizations. They will also look at what role the local and provincial governments can take in helping private sector and volunteer organizations increase recycling. A prime consideration of the hearings will be the effect recycling can have on reducing waste disposal costs and its impact on the environment. The potential for generating energy from wastes that can't be used in any re-manufacturing will also be looked at.

It's the first time Albertans will formally look at recycling issues through public hearings. And Buchwald says the timing of the hearings is a reflection of the increased business and community interest in the issue. The hearings also get underway at a less frenzied time in Alberta's economic history, a time when the province can chart its recycling future.

Rogers says current projections show a stable market for recycled materials. Some products — like cardboard that is used in the manufacturing of shingles and drywall — are recycled in Alberta. Newspapers and glass, however, are most often shipped out of the province.

Tom Rogers

Marion Wargacki, Edmonton plant manager of Turbo Resources' lubricant plant, says his company has tripled its volume of re-refined oil since the company began the process in 1968. One of two re-refiners in the province, Turbo uses additives to upgrade already used oil to meet warranty approved standards. The major users of the eight million litres of re-refined oil processed annually? Industry, says Wargacki.

There's CP Rail, for example. That company collects its used multi-grade diesel crank case oil, has Turbo re-refine it and uses it again. Turbo sales people are now approaching more potential users of the product. Oil is used in mines and fertilizer plants to control dust, and Wargacki says the company has approached a potash mine with the idea of using re-refined rather than virgin oil. And though industry welcomes the 10 to 15 per cent savings re-refined oil offers, there are few individual motorists who even know such a product is available.

"Consumers aren't quite ready to use re-refined oil yet. There's a stigma attached to it. Years ago re-refined oil was just passed through a filter system, but with today's additive packages we've found there's little difference between re-refined and virgin oil products," says Wargacki, citing an Ottawa-based RCMP study that tested five cars with virgin oil and five cars with re-refined oil, and gave both passing marks. But he does see a future increase in the number of industries that will use re-refined oil. "It is, after all, a non-renewable resource."

SUSAN BRUN

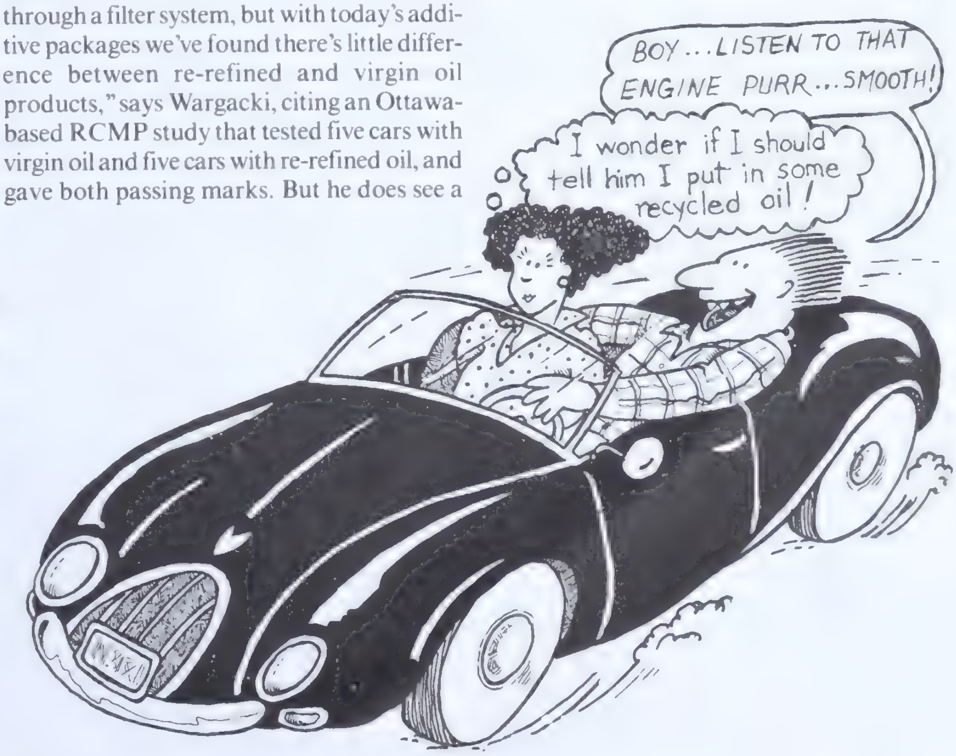
Collecting bottles for refund provides a small income, and cuts down on litter, in both rural and urban areas.

Yet another obstacle to public acceptance of re-refined oil is cost. Current federal taxation laws tax re-refined oil in the same manner as new oil. It's an issue the eight-member Canadian Refiners Association wants changed. That group is asking that only the additives be taxed — a move that would further decrease the end cost of their re-refined product.

Rogers agrees that consumer attitudes toward using recycled products such as re-refined oil continue to be a barrier to more manufacturing of recycled goods. "Using things once and throwing them away is like digging holes to fill up with garbage. But it's taken us a number of years to get into the disposable psyche, and it will take us another number of years to change over to recycling."

Another problem facing increased recycling is cost. Debbie Pound, print control co-ordinator of the Alberta Public Affairs Bureau, says that less than one per cent of the paper used by the provincial government has been recycled. The reason? Cost.

"Recycled paper is up to 75 per cent more expensive than new paper and it's harder to get," says Pound, explaining that paper mills won't produce the product in a run of less than five million (imperial) tons. Consumers asking for recycled paper face long waiting periods and receive a product that's less durable than new paper. But Pound says that if a mill was set up strictly to produce recycled paper the cost and the waiting time could be decreased. Most new paper does, however, contain some recycled fibre.



BOY ... LISTEN TO THAT ENGINE PURR ... SMOOTH!
I wonder if I should tell him I put in some recycled oil!

Around The Province

Oil collected at an Edmonton service station will be re-refined and reused.

Recycling is on the rise in Alberta. Here are some of the projects currently underway:

Alberta Waste Materials Exchange

Conceived over a year ago, the Alberta Waste Materials Exchange is designed to put potential users of wastes in contact with producers of those wastes. Used cement, packing house wastes, potato processing wastes, 200-litre drums, used computer paper, used textiles and foam, aluminum scrap, and plastics are just some of the wastes listed by the 500 companies registered with the Alberta Waste Materials Exchange.

A list of wastes wanted and those available, including such things as plastic pipe, solvents, metals and cotton rag wastes is published in a bulletin that circulates to industries and anyone requesting it across Alberta.

Project manager Charlie Wood says feedback to the first bulletin published this spring is positive. "This is a good example of how waste from one organization is money for another guy. There's all sorts of stuff, such as packing-house waste. We had a guy interested in that right away. He was a cat-food manufacturer."

If a company sees a listing for a waste they want in the bulletin, they contact the exchange and are put in touch with the producer of that waste. The $60,000 program, funded by Alberta Environment in co-operation with the Alberta Research Council is modelled after the Canadian Waste Materials Exchange operating in Ontario. Alberta's entry into the waste exchange makes it the fourth such operation in Canada, and the only one of its kind west of Manitoba.

Wood says there are more than 10 such exchanges operating in the U.S. and reports that a Minnesota woman is working toward having all the North American waste exchanges operate on the same format so that anyone on the continent could search the exchange data banks.

The exchange will publish a bulletin six times a year.

Alberta's Oil Drop Program

Used lube oil is dirty and messy and, once removed from vehicles or machinery, poses a disposal problem.

Alberta's Oil Drop program, in operation for the past two years, offers oil users a place to take the product, eventually collected for processing by one of the two Alberta oil re-refiners.

Tom Rogers, section head of assessment and implementation with Alberta Environment's waste management branch, says the collection program has enjoyed tremendous success in Alberta's rural areas. The secret? "We've encouraged the municipalities to seek a solution that suits them," says Rogers.

Rogers said some 350 service stations were asked if they would collect used oil. Though the stations always did have storage tanks for used oil there wasn't a regular collection method set up. Under the Oil Drop program interested municipalities got a grant to put in storage tanks. The used oil was then collected from service station depots and other drop-off areas and stored in the tanks until a regular collection date.

"We've found rural Albertans use the Oil Drop program more on a per capita basis, mostly because they use more oil and they don't want to dump it on their property. Many of our rural stations are collecting anywhere from 5,000 to 7,000 gallons and it makes it a reasonable supply for the refiners," Rogers says.

Urban stations have also been asked to participate in the program, and in its first year of operation an additional 1.13 million litres of used oil made their way to provincial re-refiners.

Rogers says the biggest step is finding a method of collection that suits an individual municipality. In Didsbury, for example, residents decided against individual service station collection in favor of a truck with an automatic barrel tipper to handle 200-litre drums located on farms in the area. In Alliance, a 1,300-litre capacity truck with an electric pump goes directly to farms to pump back their collected used oil.

And in Flagstaff residents opted to bring their used lube oil to service stations equipped with 200-litre drums. The drums are then picked up by the Flagstaff Regional Waste Management Authority. The yield? Each month Flagstaff generates between 5,500 to 7,000 litres of oil — enough to earn that county a small profit.

Rogers says his staff provide technical advice to the counties and also monitor the storage tanks for leakage. The future of the project? Rogers says he hopes to see it grow beyond the 10 collection systems now covering the province, because, as he says, it's this kind of everyday recycling activity that helps build recycling into everyone's consciousness.

Hanna's Recycling Program

When the Hanna Lions' Club began collecting newspaper to raise money for their community work back in 1978, they had little idea of how successful their recycling venture would be. With an Alberta Envi-

The original steel grain bin used to store newspapers for recycling by the Hanna Lions' Club.

ronment Resource Recovery grant they bought a steel grain bin to store their collected newspaper, and even when the bottom fell out of the global newspaper market in the early '80s they continued to collect and store. By 1983 the Hanna Lions had shipped out several tonnes of paper. They'd overcome the problem of transportation costs by striking a deal with a local trucking company that offered to ship the recycled goods to market free of charge.

And then they began looking at other recyclable materials.

Today the town of some 3,000 people, is a recycling centre. Two years ago the Lions entered a co-operative venture with the Town of Hanna and got another Alberta Environment Resource Recovery grant to set up a cardboard collection and baling operation located in the town's former water treatment plant. The Lions collect the cardboard they eventually sell to a building products manufacturing company in Calgary through drop-offs at the depot and by providing a monthly pick-up from residents in the area.

When the Big Country Waste Management Authority was making plans for a large regional landfill, the Hanna recyclers suggested they add a recycling depot to the waste transfer station to be built in Hanna. That recycling station will soon be the home of the paper baler operation.

But the Lions didn't stop there. By late last year, they moved into used lube oil collection. They placed 200-litre drums at various farms and businesses in the area and got an old fuel truck for collecting the used oil. The new Hanna transfer station also has a large oil storage tank, and the collected oil is sold to provincial re-refiners.

"There is nothing else like this on the prairies. Hanna is the broadest in scope," says Dave Whitfield, an Alberta Environment waste management branch resource recovery consultant who works with community groups throughout southern Alberta, "They use the money they earn to fund baseball teams and other community activities, and it has proven a very successful venture for Hanna." — *Gail Gravelines*

Individuals and organizations interested in placing their name on the Environment Council of Alberta's mailing list for next year's recycling public hearings should write to:

Environment Council of Alberta
8th Floor Weber Centre
5555 Calgary Trail
Edmonton, Alberta
T6H 5P9

It's not too difficult to get into the habit of separating household wastes: bottles and tins for refund, newspapers for recycling and vegetable scraps for the compost bin.

Rogers says he is often asked if recycling is economical. He answers that when most people talk about the economics of recycling, they are comparing it with conventional garbage collection costs. Simply throwing away unsorted wastes may be more convenient, but garbage collection is publicly subsidized, he says. And it's getting costlier. Introducing a system that has recyclable goods sorted at source would prove economical, he says, because the reusable goods could be sold and the money made used to offset waste collection.

One proven method of encouraging recycling is to provide readily accessible collection depots. It's a system that has worked for Foothills Recycling. Company president and founder John Ellacott says his firm places a newspaper collection container at a specific location in some 20 Calgary neighborhoods one weekend of each month. The company services 50,000 Calgary homes and pays $20 to each community for every (imperial) ton of paper they collect.

"It's consistent and people get in the habit of collecting their newspapers. Community groups gear up and anticipate a set income."

Though Ellacott says price fluctuations for newsprint are "hair raising", he pays the set $20 rate to encourage consistency. Albertans already recycle one-third of their newsprint, but Ellacott says there is a limited local demand for the product which can be reused to make asphalt shingles, drywall, insulation and other building products.

Until last spring, Ellacott says he used most of the recycled newspaper at his insulation manufacturing plant. But changes in the federal Canadian Home Insulation Program decreased demand for his product and he sold the plant. Now he sells the paper to other brokers who ship it to large American newspaper recycling plants in Oregon, where it is de-inked and readied for reuse as newsprint.

One advantage Alberta recyclers of newspaper have is lower transportation costs. Ellacott points out that because most goods are transported to Alberta, truck and rail lines offer a lower back haul rate to move goods out of the province. The rate benefits the transportation companies because their trucks and railcars aren't returning empty.

But it's the roller-coaster-like global demand for newsprint that Ellacott says makes his business a tough one. A current glut of newsprint has decreased prices, and recyclers are hanging on waiting for better days. Through it all, Foothills continues to collect from the Calgary neighborhoods – to ensure continued supply once the market improves.

Rising world silver prices prompted Bill Moure, president of W.M.J. Metals Ltd. in Falun, just west of Wetaskiwin, to launch his silver recovery operation. Since 1980, Moure has used an incinerating process to reclaim the silver used in photographic and x-ray film. He reclaims the silver from the film and negatives used at four of Alberta's largest newspapers. Moure will either charge a fee for his service and return the reclaimed silver to the original users, or he will reclaim silver then sell it to a silver refiner in Toronto.

Moure says his silver reclaiming company wouldn't produce enough profit to provide a full-time income. But the operation is located on his farm and provides additional dollars to his agricultural income. Moure's plans for the future? He'll be getting his master's degree in metallurgical engineering and hopes to invent a chemical process for recovering lead from scrap batteries. The current process creates lead dust proven harmful to worker safety.

Rogers says Alberta Environment's waste management branch helps community groups set up recycling projects, providing advice and dollars through the Resource Recovery capital grant program.

And response is good. At the first Prairie Recycling Conference held in Edmonton last year, it was revealed that Albertans led other western Canadians in recycling activity. Rogers says that people here still relate to the land and want to protect it. For example, the County of Flagstaff now collects used lube oil to sell to re-refiners. Service stations in the area bought some 250 200-litre drums to collect used oil. The Flagstaff Regional Waste Management Authority provides a monthly pick-up of the used oil and sells it to the re-refiners. The sale of the 5,000 to 7,000 litres of oil collected each month covers costs and is actually making the area a profit.

Within the next two years, Rogers says Albertans will be introduced to a multi-material curb side collection scheme similar to that already used in Kitchener-Waterloo. Each household will be issued a box that sits in their kitchen for collecting cans, bottles and glass jars. Newspapers will be stored separately, and all will be picked up by a recycling truck.

Rogers says the plan will provide two advantages: residents will sort their wastes at the source, and in doing so will become more accustomed to the recycling as a part of their daily lives.

Gail Gravelines, a former journalist, is an Edmonton freelance writer.

Jim Wilson

The Fate of the Landfill

The flyblown dump is being replaced by safer, but more costly, alternatives

Quick, now, what rhymes with "garbage"?

Poets make a big thing of the fact that nothing rhymes with "orange" — but does anyone care that "garbage" is a loner too?

Believe it or not, that's one of the problems of effective management of sanitary landfills, those modern answers to the historic garbage dump.

"There's a tremendous stigma attached to our refuse and also to anywhere we deposit it," says John Slupsky, of Alberta Environment's waste management division. "The biggest problem is that people are very misinformed about what a sanitary landfill is. So when we try to develop a new landfill site, people in the area conjure up an image of a smelly old garbage dump and fight to keep it out of their neighborhood."

And nothing, or at least almost nothing, could be further from the truth, because today's methods of handling the things we discard are vastly different from what's been done in the past.

Man has been dumping materials he doesn't want anymore for hundreds of thousands of years — and indeed archeologists owe much of what they have learned about our prehistoric forefathers to studies of their garbage.

As tribes gathered into small communities and those communities blossomed into towns and cities, their waste management problem grew dramatically. Natural holes in the ground, riverbanks, any convenient depression became a "dump". And failing those convenient locations, the stuff was simply stacked into noisome piles – hopefully downwind of the population.

The most obvious result was development of an odorous eyesore, but the most dangerous and unfortunately less obvious results were that the dumps provided an organically rich location where disease-carrying vermin and bacteria could thrive, and poisonous liquids could fester and eventually flow through the ground into the community's water supply.

And that's what most communities had until only a few years ago. The term "dump" was euphemised into "nuisance ground" and a few controls placed on the kinds of refuse that could be deposited in them, but they were still potentially dangerous places.

Today, all that has been changed. Our normal day-to-day refuse is taken to carefully-designed and regulated sanitary landfills in our larger cities, and in smaller communities closely-regulated but simpler landfill sites are being developed. Dangerous materials are separated out and taken to special hazardous waste sites. There are very few of those old "nuisance grounds" left.

Properly managed, these modern waste management sites are safe, clean-smelling and can eventually be reclaimed for recreational and even for agricultural use.

"A sanitary landfull is an engineered and carefully designed facility operated in a planned manner and established on a site that is highly suitable in hydrogeological terms for containing waste materials", says AE's Slupsky. "It is always supervised when it's open, and a 15-centimetre layer of clean soil is spread over it every day."

Such facilities can be somewhat expensive to create and operate, so there are also "modified" landfill options available to smaller communities and co-operative regional groups, serving a population of 10,000 or less. These have similar hydrogeological suitability requirements, but are not supervised and are covered with clean soil only once every few months.

Unfortunately, the modified landfill sometimes and the remaining town dumps invariably smell, catch fire and annoy their neighbors. And even today's completely unsupervised dump is likely to have the much more acceptable "sanitary landfull" name on a nearby sign. The result is the public confusion and misinformation that Slupsky mentions.

The site's hydrogeological elements are the key to safety. In a good location, the landfill operator in effect creates a gigantic bathtub-shaped trench whose base and walls are clay or other non-porous materials. The trench bottom must be at least 1.5 metres above the historic high for the water table, and the soil must be sufficiently stable that it has a ground velocity of less than one metre of movement per century. Streams certainly must not run through it, so in many cases must be diverted. And to stop runoff from entering the trench, earth berms are built around its edges.

John Slupsky

Some landfills are located on the surface instead of in trenches, and the regulations are virtually the same for them except that they grow upward from ground level. In these cases the wastes are deposited according to preplanned patterns so that when the area is eventually reclaimed, visually attractive and contoured hills will result.

In order to aid decomposition, avoid fires and keep the landfill from spreading repulsive odors, the entire deposit must be covered with a layer of earth every day (in small sanitary landfill sites the regulation is three times a week). The average site has a lifetime of about 20 years, although it is likely that many of them will be enlarged to extend that period.

"They work very well," Slupsky says, "because you have a completely controlled environment and nothing occurs there that shouldn't." And while an unsupervised modified landfill isn't as controlled, he says it is still far superior to the old dump, and will be easier to reclaim.

Edmonton's Rundle Park is built on a reclaimed landfill site.

Still, even the old dumps can be reclaimed with careful planning. The old Rat Creek Ravine in Edmonton, for example, had been a completely unsupervised dump — with all the negative things including poisons, fires and vermin. But Commonwealth Stadium was built on part of the site after an area of the dump was excavated and cleared out, and nearby Clarke Stadium was actually built right on the garbage.

Again in Edmonton, the Beverly dump was reclaimed and made into Rundle Park, an 18-hole par-three golf course and recreation area. In this case, special equipment was placed in the clubhouse to avoid the dangers of methane gas that decomposition or organic wastes will always create.

"Alberta has been quite active in this sort of reclamation," says Lawrence Kryviak, head of AE's land reclamation branch. "Sometimes it's a bit tricky, but it can be accomplished. For instance at Cardiff the community had been using an abandoned mine as a dump for years. Unfortunately it was in a high water table area, and by the time reclamation work was started there was a rather gruesome stew in there — more than 50 million litres of the stuff. But we cleaned it all out, and it's now part of the Cardiff Regional Park."

In Okotoks, he says, an old dump was reclaimed and is now a playing field for a regional high school — which was safely built just 15 metres from the dump site. Leduc, Red Deer, Lacombe, Carstairs and many other communities have similarly benefited from reclamation projects.

Not all such projects, though, are completely successful. For instance, Kryviak says Alberta Environment is currently working with officials in High Prairie to solve problems that have arisen following a project there. A dump had been covered over many years ago, but because of its location, garbage continued to wash into the river. A day care centre was also built at the site, and must take measures to control the methane gas that is given off by the old nuisance ground.

Methane gas and "leachates" — the liquids that settle out of garbage over the years — are the major problems associated with all waste management activities — even today's sanitary landfills. Methane is the unavoidable result of decomposition of the organic parts of our refuse, and the leachates are simply the very unpleasant and generally poisonous syrupy liquid remainders that settle to the bottom of the landfill. Where methane becomes a serious problem it can be drawn off and flared, and leachates are often controlled by slant-

At Flagstaff a large container stores local refuse. When full, the container is hauled to the regional landfill at Forestburg.

ing the landfill trench or base slightly to one corner, where they collect and can also be drawn off if necessary.

Every effort is also made to keep the leachate from entering the water table. It is potentially dangerous by itself, but because such hazardous materials as pesticides and their containers are also sometimes improperly dumped in landfills, the leachate can become truly lethal.

Methane in some countries is deliberately drawn from landfills, or is created by burning the organic wastes in special furnaces from which air is excluded, in a process called pyrolysis. The methane gas can then be used as a fuel for heating or generating electricity. In Alberta, energy prices have kept this from becoming a viable operation.

Other forms of recycling Alberta wastes, however, have been tried — often with significant success. Perhaps the best example is bottles and cans, which people separate from their garbage because of provincial regulations requiring a refundable deposit on them. Paper is frequently separated from the rest of the household garbage for recycling.

Bill Flook, chairman of the Environment Council of Alberta's urban advisory committee, believes this sort of recycling should be emphasized and that landfills should only be used for what's left.

"What we're doing today is incredibly wasteful," Flook says. He believes most residential waste could be recycled into new products if governments primed the pump, so to speak, by banking in various categories until there was a sufficient quantity to make processing it viable.

"Garbage," he insists, "is a resource, not a nuisance."

Flook would like to see householders separate their refuse into five types: glass, paper, plastics, metals and ordinary organic materials. The community could then collect the various categories and handle them differently.

"Right now no one is going to get into the recycling business because they wouldn't have a guaranteed supply of materials," he says. "They couldn't enter into contracts because of that uncertainty. But if we had sufficient material in storage, they could start."

At that point only organic materials would go to the landfill, he says, and in future even that material might find recycling uses.

Flook points to a Kitchener, Ont. program where a private disposal company is already participating in a similar program. With a $200,000 city grant, the company distributed special bright blue garbage cans to people in a carefully selected pilot area. Household wastes are separated into several categories, which the company can then recycle. The program has worked so well, Flook says, that "neighbors who were not part of the initial program began to feel left out and asked to become part of the project."

Landfills operators are also finding new uses for their garbage resource. Wind can be a major problem, especially in Prairie communities where it blows paper and similar wastes from even the best-managed facilities. The simple solution? Use a mechanical baler to gather at least some of the garbage into tight bundles similar to hay bales. The lighter constituents can no longer blow away — and compressing the wastes together tends to change the odor so that the bales do not smell like garbage or attract birds and animals.

FRIED KATZ

Bill Flook

During the warm months it's easy to dig out clean soil to be spread as the law requires over top of each day's wastes deposit in the landfill. But in the winter, digging up the frozen ground ranges from difficult to impossible.

In Edmonton, a special shredder is used to grind up a small amount — about five per cent — of the city's 550,000-tonne annual refuse output. The material is then taken to an area near the Clover Bar landfill and spread over the ground about 75 centimetres deep. This creates an efficient insulation layer, which is removed bit by bit during the winter to expose unfrozen soil which is then dug up and used in the landfill.

There are many other waste management programs, some of which recycle refuse, and others of which simply reduce its volume. Some communities have sophisticated composting facilities which take organic garbage and process it to provide agriculturally-rich compost. Others incinerate much of their garbage, sometimes generating heat or electricity either by producing methane gas or by using special furnaces whose walls contain water, which is turned into steam that in turn generates power.

Most often, incineration is simply a means of reducing the volume of waste that must be handled — the resulting ash and unburnable debris still goes to a landfill site.

"In Europe," says AE's Slupsky, "there are communities where they shred the waste, separate the inert materials out for other purposes, and then take the remainder and press it into pellets they call 'eco-fuel'. They feed the pellets into burners for energy recovery. But you have to remember, energy is expensive in Europe — that wouldn't be economic here."

Still, finding some method of retrieving some of the landfill operation costs is an attractive possibility — particularly given the never-ending amount of raw material available.

"Clover Bar Landfill in Edmonton has been developing now for about 10 years," says Roy Neehall, Edmonton systems planning and design engineer. Every year we spend about $500,000 just to develop the site. The cost of planning, designing, building and operating a landfill can be tremendous — and the costs go up all the time."

Handling costs alone for residential wastes are about $3.43 per tonne, he says, and in many U.S. communities they can be as high has $10. And once the landfill is full, there are also the costs associated with reclamation.

Still, landfills are the way of the future. Larger centres are expected to pay their own way, but that's not always practical for small communities. And to help them, Alberta Environment has the Regional Waste Management Assistance Program. To qualify for assistance, two or more communities and the surrounding rural area must join forces to establish a regional sanitary landfill site, and agree to close down existing open dumps. In return, the program provides hydrogeologic investigation of selected sites, and most capital costs required in the development. The communities themselves must assume all operating costs from that point on.

Roy Neehall

And in the larger centres, procedures are becoming more efficient as the size of the waste stream grows. Transfer stations – garbage warehouses — are being established throughout many cities, and in regional operations as well, at which small loads are dropped off. Large trucks then collect the waste materials and transfer them to the actual landfill site.

The dump has become safe, sanitary – and a source of future recreational opportunities. But it hasn't lost that historically important side-effect: many years from now, archeologists and anthropologists will still be able to get a look at our lifestyle through our garbage.

Jim Wilson, a former journalist, is a Calgary freelance writer. He is currently publishing a book on Kananaskis Country with his wife, Norma Ramage.

A Lingering Problem

Not everyone is satisfied that Alberta has its waste management practices under control, even though the regulations and their intent may be good.

Hank Holowaychuk, a Smokey Lake area farmer and environmental chairman of the Alberta Fish and Game Association, is concerned that some landfills in the province, particularly those in smaller communities, are not being operated properly.

"We live on the same quarter-section as an excellent example of some of the problems," Holowaychuk says. For several years he's been waging a battle with Smokey Lake, with the surrounding county and with the provincial government, attempting to force the local refuse depository to abide by regulations set out for modified landfills.

Fires are forbidden on Alberta landfill sites except in very specific and regulated circumstances, but Holowaychuk says there are at least 20 fires a year at the site. Hazardous wastes like pesticides and their containers are not supposed to be dumped in landfills, but he says this happens there frequently.

(This isn't unique to Smokey Lake — even in well-supervised city landfills, people frequently dump dangerous containers with the rest of their refuse.)

"It's certainly not the town or the county that's setting the fires," Holowaychuk admits. "It's residents — they want to destroy confidential papers, or a dead animal, so they take it to the landfill and set it on fire, and the fire spreads. Or farmers bring in smouldering garbage and dump it, and that spreads. Or some pyromaniac just wants to see a fire and lights one.

Fire is an almost-constant problem at unsupervised landfills.

"The results are the same — dangerous chemicals in the smoke, from burning plastics and chemicals, and they're spread all over the area."

But what annoys Holowaychuk the most is that no one will take responsibility for the problem.

The town owns the landfill, but purchased land outside the town limits from the surrounding county for its site. In return, county residents are permitted to dump their refuse in it.

The town has a bylaw forbidding burning of refuse; the county does not. So the city's sign at the landfill threatening a fine for anyone who sets a fire can't be enforced — it's not within town limits.

The regional health officials say they can't monitor the landfill and really can't stop the fires, which after all are not set officially by the town. Alberta Environment can't take action because the situation is outside its jurisdiction. And provincial health officials can't act because enforcement of the Health Act and its landfill regulations is assigned to local officials — who lack the manpower and equipment to do anything.

"A few years ago I led a fight to make sure the county people could use the landfill," Holowaychuk says. "Now I'm not sure that was a good idea."

And frequently throughout the year, particularly in the spring when there's a lot of refuse that hasn't yet been covered by the required layer of clean soil because the ground has been frozen, the smoke and the odors are reminders to Holowaychuk that even the best of regulations isn't always perfect.

— Jim Wilson

Linda Goyette

What You Can Do

Individual responsibility *can* make a difference

Sally Issenman (centre) and the shed where her housing co-op collects cans and bottles for recycling.

"My life depends on orange plastic garbage bags and the people who come to take them away," says Paddy Moreton in the matter-of-fact tone of an unabashed consumer. The trash bin outside her Edmonton condominium would make a conservationist weep. Disposables, refundables, recyclables, old vegetables. If Moreton feels any shame, she wraps it up with the eggshells and coffee grounds and throws it out.

"I put out hundreds for Pampers and Diet Orange and I don't consider it my job to get rid of it," says the 35-year-old professional woman and single parent. "Time is a major factor. I don't want to drive hither and yon with bottles and cans. I feel guilty if I waste food. But otherwise, as a consumer, I feel no guilt. On the global scale of problems, it is way down on my list. It seems to me it's something my tax dollars should take care of."

Moreton calls herself a decadent waster, an extremist. But she's not much different than the rest of us. Alberta families throw out 400 million kilograms of paper, 70 million kilograms of cans and metals and 15 million kilograms of glass per year. Almost all of it could be recycled. Most of it isn't.

The true experts — the garbagemen — tell the sordid story behind the statistics. Mike Markowski, a University of Alberta science student who works as a city trash collector in the summer, says the job can nag the conscience. "I picked up three kids' bicycles the other day," he says. He's also found television sets, radios, chairs, toasters, clothing — some of it in excellent condition — on collection day. In affluent neighborhoods, the garbage bundles are often immaculate "but quality items tend to turn up more frequently". Garbage collectors are forbidden to scrounge from the bins so many useful, expensive articles end up in the city landfill.

Has the job made Markowski an avid recycler at home? "I couldn't say it's had a big effect," he concedes. "I wouldn't mind being more of a conservationist but I have a job and I'm volunteering. I don't have much time for this sort of thing. The most efficient thing for me to do is throw it out."

Moreton and Markowski are typical consumers of the 1980s, too busy to add complicated conserver tasks to their daily schedule. Who can blame them? In an age when polluters can endanger whole cities with industrial wastes, when our planet is cluttered with threatening military hardware, it's difficult to believe that one more orange peel on the compost heap can make a difference. Can a committed individual contribute anything meaningful in the battle for sensible solid waste management?

In *Living More With Less*, a practical guide to conservation in the home, Doris Janzen Longacre addresses the question: "Certainly, your influence is small," she writes. "But whether you conserve or waste, it is real. Many people using or not using affects things in a big way. Gathering up the fragments of our waste — recycling, conserving, sharing — is a logical and authentic beginning."

Some Albertans need no convincing. Working in small groups or as individuals, they advocate careful waste management in the home, at work, in the neighborhood and the nation. Their suggestions are practical and often simple, sometimes obvious and sometimes offbeat.

Bob Jacobson, 45, is the first to say his approach isn't for everyone. His environmental conscience was born of religious conviction. "I do have a commitment to a conserver lifestyle," says the Lutheran clergyman. "It's my belief that it can bring greater happiness. If we have inner happiness, we don't need all the outer fill that goes along with a more material way of life."

Five years ago, Jacobson and his family bought an abandoned quarter-section of land near Bashaw and constructed a "primitive but very nice" stack wall house. They voluntarily gave up electricity, running water, household appliances and other energy-wasting features of modern life. At the Jacobson farm, war was declared on the throw-away ethic. "Like everyone else, we had some stuff that went to the dump," said the pastor. "But what the pigs could eat went through them and onto the garden. If it wasn't edible for pigs, it went to the compost heap." All farm buildings, including the outhouse, were made of scavenged junk wood. The family made an effort to reduce their waste by controlling purchases, often bartering food and labor with neighbors. "These have been the best year of our lives," said Jacobson. "We've enjoyed the work."

Many consumers in the 1980s are too busy to add complicated conserver tasks to their daily schedule.

Recently elected a church bishop, Jacobson is now trying to adapt his environmental principles to a new life in Edmonton. His family plans to live in an apartment but will maintain the farm garden for their own use. "We're going to be dependent on a lot more technology," he said. "But there are degrees of wastefulness and we will try to be as careful as we can."

Dan Gomez, 45, is another rural Albertan who tries to control waste production at home. An immigrant from Mexico, he comes from a background "that stressed that you do the best with what you have." His family lives in a solar-heated house, just north of Tofield, and runs a 58-hive beekeeping operation. Like Jacobson, Gomez separates household refuse and saves biodegradable material for the compost heap. Waste paper is rolled into tight "logs" for the woodstove. The family visits thrift shops for clothing, as matter of conviction not necessity.

The Conservation Payoff

Going all out with the less-with-more approach takes time, but the rewards can be greater than just the satisfaction of knowing you're doing the right thing. Brian Nelson of Ohaton, in the Camrose area, has found that he has saved thousands of dollars over the past few years by an imaginative combination of scavenging, bartering, sharing and fixing.

The Nelson family contributes very little to the local landfill, and as well, they find good uses for a lot of things discarded by others.

Their house contains about $18,000 worth of recycled building materials, including plumbing and lighting fixtures. Each time Nelson buys an inexpensive used vehicle, he buys another of the same model in worse condition, to use for parts. Very little else is bought new, either — their clothes dryer is a well made and reliable 1960 model which cost $50.

The dryer needed just one wire replaced to restore it to its former glory, but often keeping ancient vehicles going and reusing discarded building materials takes at least basic handyman skills — and more than a little time and patience.

But Nelson, the part time ecological development co-ordinator of the One World institute in Camrose, has come to the somewhat surprising conclusion that his scavenging, fixing and bartering pay better than going out to work.

"In fact," he says, "I can't afford to work full time. I figured it out. I save more by doing these things than I would earn by working full-time, if you calculate taxes and so forth."

While many elements of this lifestyle are possible in the city, Nelson concedes that living in the country is an advantage, especially for scavenging. Many farmers, including the Nelsons, have a discard pile in the yard, and among the castoffs there may be just the piece of angle iron, or the length of pipe someone else is looking for. The result: a trip to the dump saved by one family and a shopping trip saved for another.

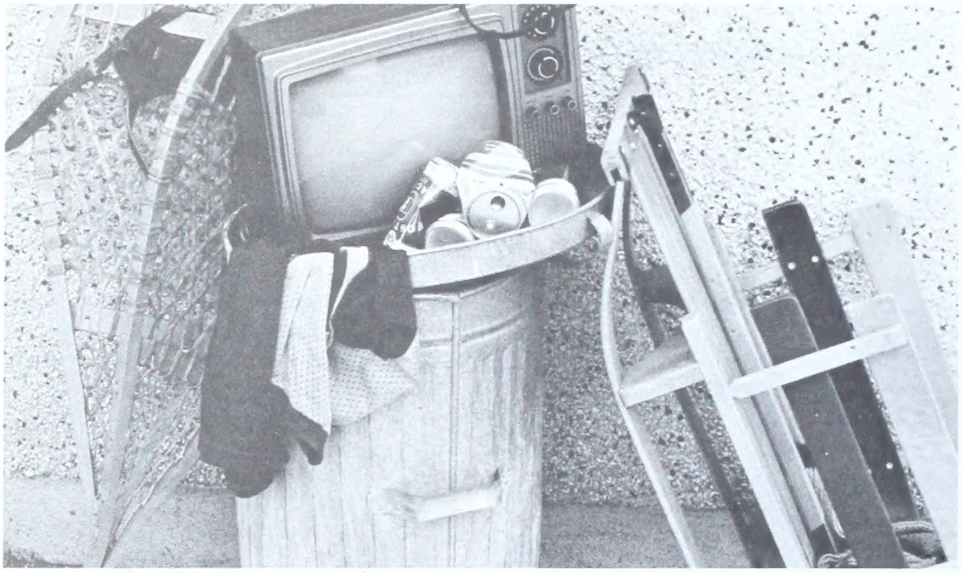
Nelson is not a frequent patron of auctions and garage sales, finding that with a little foraging, much of what he needs can be found free for the asking. He deplores the current trend to selling one's discards through garage sales and consignment sales as ungenerous, and suspects that charitable organizations using thrift shops or rummage sales for fundraising must be suffering as a result.

Making your own furniture or clothing from discarded materials — a butcher block table from mill ends, children's clothes from sewing scraps — is another area where time and skills are rewarded with savings, he points out.

— *Maryhelen Vicars*

SAY THERE, OTTO! YOU THROUGH WITH THAT OLD BARN OF YOURS YET?

MARTHA JONES



SUSAN BRUN

Reusable or recyclable goods are often left for the garbage truck. Sanitation workers are not allowed to scrounge from the cans.

A school janitor, Gomez is exasperated with the amount of waste in the workplace. He makes regular trips to Edmonton recycling depots with bottles and cans. "I only wish I had time to take all the paper that goes into the school's incinerator," he adds. "I feel sometimes that children should be encouraged to separate the garbage themselves."

To limit garbage production, says Gomez, we must control our obsession for unnecessary consumer goods. "I wish more people would look at how much they could live without," he says. "That's the key. Don't go spending your money on things in the stores you don't need."

Possibilities for garbage reduction in the home and workplace are as numerous as trash cans at the curbside on a Monday morning. Consider a few.

- Begin, perhaps, with that Himalayan mound of old newspapers in the basement. Bundle them up and take them to a recycling depot if you can. One family's annual supply of newspapers can be recycled into almost enough insulation for a house. But save a few — there are some alternative uses for all the news that's fit to print.
- Rip the sheets into half-page pieces and store them in a convenient place. Use newspaper in the kitchen for absorbing fat or grease in pots before you wash them, for sifting dry ingredients and peeling and cutting vegetables and fruit. Use it to wash windows, line budgie cages, wrap out-of-town parcels and insulate food for storage or transport. Rely on the Saturday comics for kitchen clean-up operations and eliminate paper towels. Finally, consider sharing a newspaper subscription with a neighbor. The two major Alberta dailies are delivered in the morning, allowing lots of reading time for two families. With a little effort, the newsprint mountain in the cellar can shrink considerably.
- Your new plan of restraint could also begin in the grocery store. Pare your purchases to the essential. Ban non-returnables, disposables and overpackaged products from your shopping list. Avoid the styrofoam tray. Use handkerchiefs instead of paper tissue, cloth napkins instead of paper serviettes. Insist on paper rather than plastic bags at the check-out counter and complain to the grocer if you have no choice.

> *"Recycling, to be effective, has to work in concert with other action."*

- Buy fresh produce that requires no packaging. Buy food in bulk and provide your own containers from home. Some stores offer household cleaners, detergents and shampoo in bulk. Fill up your reusable container or make the product yourself from easily-obtained ingredients.
- At home, use old glass jars, yogurt, ice cream and margarine containers to store food. Use paper bags for lining garbage cans and wrapping packages. Store household items and children's toys in cardboard boxes. Keep old clothes for dust cloths and rags. Convert worn bedsheets into pillowcases. Use old wrapping paper and leftover wallpaper remnants to line drawers in a bedroom bureau. Find a corner in your house — a kitchen shelf or a box in the basement — to store odds and ends that can be used again: paper clips, envelopes, ribbon, rubber bands, string, shopping bags and gift-size cardboard boxes.
- Buy durable products to get more value for your hard-earned dollar. Exchange unwanted clothes, magazines, books and household goods with friends, sell them at a garage sale or donate them to charity. Give extra produce from a bountiful backyard garden to an inner-city food bank. Consider sharing expensive equipment — lawnmowers, woodworking tools, garden appliances, ladders — with family members or neighbors. Buy second-hand goods if the price and quality are right. A second-hand wedding ring might tarnish romance but a used picnic table is just as good as a new one.
- Finally, make every effort to recycle household refuse before banishing it to the back alley bins. Separate the trash and

Suggested Reading

Alberta libraries are full of books with practical suggestions about effective solid waste management in the home, at work and in the community. Here are a few to look for:

Stu Campbell, *Let it Rot: The Home Gardeners Guide to Composting* (Garden Way Publishing, 1975)

Centre for Science in the Public Interest, *99 Ways to a Simpler Lifestyle* (Anchor Books, 1977)

Energy, Mines and Resources Canada, *The Garbage Book: How to Save Energy and Money By Throwing Out Less* (Government of Canada, 1976)

Carolyn Jabs, *Re/Uses: 2,133 Ways to Reuse and Recycle Things You Ordinarily Throw Away* (Crown Publishers, 1982)

Doris Janzen Longacre, *Living More With Less* (Herald Press, 1980)

For Children

Environmental Action Coalition, *It's Your Environment: Things to Think About, Things to Do* (Scribner, 1976)

Ruth Johnson, *What to Do Till the Garbageman Comes* (Gage, 1976) deliver newspapers, bottles and cans to recycling depots if you can. Choose a specific time every week to complete the task. Create a compost heap in your yard from waste food products, leaves, grass clippings and garden plants. Take used automobile oil to collection tanks at service stations displaying the Alberta Oil Drop sign.

- At work, check for evidence of waste in the organization and bring it to the attention of cost-conscious superiors. Avoid unnecessary purchases of equipment and machinery. Reduce photocopying and get the most out of paper and envelopes. Lobby to reduce food waste in the cafeteria and the use of disposable tableware.

Too much work? Not if neighbors and work colleagues coordinate their effort, says Sally Issenman, a member of the recycling committee at Sundance Housing Co-operative in Edmonton. Residents in 69 co-op units separate their garbage and discard recyclable items in two sheds on the property. Deposit bottles, household glass, flattened steel tins, aluminum cans and plastic bottles are left in one shed; bundles of newspapers fill the other.

"I don't know how high a percentage of involvement we get but we do quite well," says Issenman. "We do have lots of garbage left for the city collectors but the sheds fill up quickly."

Co-op members are encouraged to exchange unwanted possessions on clean-up days and at sidewalk sales. "It's also perfectly okay to go through the garbage to see what you can find," says Issenman. Once a month, the contents of the recycle sheds are emptied into a Toyota pick-up and taken to the depots. The co-op has earned "a couple thousand dollars" from the sale of recycled goods and plans to build a bicycle storage area with the money. "We want to put it into things that will benefit the co-op and also support the conservation ethic," says Issenman. She emphasizes that any neighborhood or community league could adapt the Sundance approach.

Ban disposables, non-returnables, and overpackaged products from your shopping list.

About 1,500 Edmonton families may take a different route to responsible waste management next spring. The city's water and sanitation department is planning a pilot project, still subject to financial approval, that would collect glass, newspaper and metal for recycling in a separate garbage pick-up. Bill Worton, manager of solid waste disposal, would like to see the idea extended to all city residents "providing the taxpayer doesn't have to pick up the financial burden." So far, recycle collections haven't been cost-effective. Worton says studies show that people's compliance is "top-notch to begin with but than it falls to nothing." Still, he suspects recession-weary city residents may support the battle against waste: "In tougher times, people are willing to make an extra effort."

That extra effort demands more than vigilance at the garbage bin. "Recycling, to be effective, has to work in concert with other action," says Issenman. Consumers must control their own worst impulses but they must also demand corporate responsibility from companies that pollute the environment with solid waste or sell wasteful or dangerous goods to unwitting buyers.

Putting pen to recycled paper with a firm warning of a boycott may, in the end, be more effective than a hundred weary trips to the bottle depot. But no individual effort is too petty to make an impact. Any action is better than none.

Linda Goyette is an Edmonton freelance journalist and scriptwriter.

LUANNE MARKS

Workers at the South Edmonton Bottle Depot counting and sorting bottles.

If undelivered, return to:

Environment Views
Alberta Environment
9820 - 106 Street
Edmonton, Alberta T5K 2J6

Environment Update

Environmental Evidence Course

The Banff Centre School of Management is offering a "How to Present Environmental Evidence" seminar October 20 - 25, 1985.

The course, now in its sixth year at the Banff Centre, will review the legal and regulatory framework as it applies to those who work in resource development and environmental management. Another major focus of the course will be working with expert witnesses: how to brief them, how to use them effectively in the presentation of evidence, and how experts should respond to cross examination.

For registration details or further information, contact Susie Washington, resource programs manager, Banff Centre School of Management, (403) 762-6133.

On Golden Sludge

There may be gold mining soon at Toronto's largest waste treatment plant. According to a report commissioned by Environment Canada, metallurgists have determined that among the many metallic residues in the sea sewage handled by the Ashbridges Bay plant, which serves an industrial area, is gold at concentrations of almost four grams per tonne of waste ash, just a little richer than the ore at Noranda Mines Inc.'s Pamour Mine near Timmins, Ont.

Education Award

Alberta Environment recently was made the recipient of an award of appreciation presented by the Environmental and Outdoor Education Council of the Alberta Teachers' Association.

The award was presented in recognition of over a decade of service to environmental education by the department. Specifically the council recognized the efforts of the department's environmental education branch. The branch has produced numerous units of study, activities and other print resources as well as providing hundreds of teacher inservice opportunities.

Drinking Water

A call for papers has been issued for the second national conference on *Drinking Water — Treatment for Organic Contaminants*, to be held in Edmonton April 7 and 8, 1986.

The conference will examine technologies for treating organic contaminants in drinking water. The program will include a number of invited presentations by internationally recognized experts.

Abstracts and requests for more information should be directed to: Chairman, Second National Conference on Drinking Water, c/o Department of Civil Engineering, University of Alberta, Edmonton, Alberta, Canada, T6G 2G7.

Pollution Control

The Air Pollution Control Association will hold a three-day technical meeting November 13 - 15 in Calgary. The theme is *Air Toxics and the Quality of Life*. The meeting is sponsored by the association's Canadian Prairie and Northern Section, and the Pacific Northwest International Section.

For more information contact Jackie MacNeill, 180, 3025 - 12 Street N.E., Calgary, Alberta, T2E 7J2 (250-5025).

Environmental Economics

Proceedings from the 1985 symposium on *The Economics of Environmental Protection*, sponsored by the Alberta Chapter of the Canadian Society of Environmental Biologists, are now available. This conference brought together speakers and participants from Canada and from the U.S. to discuss assigning values to environmental things, economic factors affecting environmental decision-making, and public attitudes toward common-property resources. The cost for proceedings from the two-day meeting will be $12 - $15; more information can be obtained by contacting Kim Sanderson at 427-5792 or by writing to the Alberta Chapter, C.S.E.B., Box 12, Substation 11, Edmonton, Alberta, T6G 2E0.

Proceedings from the 1984 symposium on "Decision-Making: The Role of Environmental Information" as well as the 1983 symposium on "Resource Management in the Eastern Slopes" are still available at a cost of $10.

Youth and the Environment Conference

The youth view of the Alberta environment was examined at the Environment Week '85 conference held at the University of Alberta in June. *Youth and the Environment* drew 150 youth and adult delegates from across Alberta. Six youth groups made presentations on various environmental topics including among others, water supply and development, air quality and sour gas, impact of oilsands development and multiple use in wilderness areas.

Speakers who addressed the conference included Environment Minister Fred Bradley; David Brower, chairman of Friends of the Earth; Alistair Crerar, director of the Environment Council of Alberta; Jim Shields, M.P. and Rob McIntosh, Alberta Environment Network.

The youth delegates prepared a number of statements that will be worked into a "youth declaration on the Alberta environment to the year 2000". This along with the copy of each of the youth presentations will be prepared in booklet form and distributed to schools and libraries by Alberta Environment in late November, 1985.

If you have a short news item of province-wide interest you'd like to contribute to Environment Update, please send it to the editor at the address on the Contents page. The editor reserves the right to select and edit the items.